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“A COMPLEX AND GRAVE SITUATION”

A POLITICAL CHRONOLOGY OF THE
SARS-COV-2 OUTBREAK



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"A COMPLEX AND GRAVE SITUATION"

This report draws on numerous sources published in English and Chinese to examine the posture taken by the authorities of the People's Republic of China (PRC) toward biosecurity, biosafety, and public health starting from 2018 until 2021. Its primary focus is on tracing the authorities' response to the emergence of SARS-CoV-2, the virus that causes COVID-19, as it progressed from a localized outbreak to a national epidemic to a full-fledged pandemic.

Many of the matters described in the chronology have appeared in reporting elsewhere, but their significance is illuminated anew when analyzed chronologically and collectively. Considerable information gleaned from Chinese language sources appears here for the first time, shedding much needed light on key questions and providing new context to the existing body of reporting. An extensive background section is included before the chronology to aid the reader in understanding the political, economic, and security backdrop against which the initial outbreak occurred in China. To be clear, it is the aggregate picture that emerges from this report – not any particular piece of information standing as a proverbial “smoking gun” – which matters most when assessing the origin question.

Beijing's efforts to render imperceptible the exact timing and original cause of the initial outbreak of SARS-CoV-2 are what necessitated this study. As its refusal to cooperate fully with the World Health Organization (WHO) has shown, Beijing's efforts to keep these facts well beyond the world's reach continue unabated. Scientists have not yet succeeded at tracing the origin because they have been denied access to the data that would facilitate a retrospective study of its genomic epidemiology. The epidemiological data released by the Chinese Communist Party (CCP) appears to have been curated to create an informational maze that leads to perpetual puzzlement. As long as we approach the origin as an inherently scientific question to be answered solely by the methods of science, we empower the CCP to keep hiding the data that would most readily satisfy the evidentiary standards of science.

It is not the limits of science that constrain our understanding of the origin of SARS-CoV-2. It was the political decision to block scientists from accessing the clinical and genomic data that would have allowed them to methodically reconstruct what happened. For this reason, we approached the origin question as a political puzzle, first and foremost, with a scientific component that is important, but not decisively so. This report borrowed a legal standard – the preponderance of the evidence – to assess what we know at this juncture, using the admittedly incomplete information we have available. Whatever its limitations, we trust that most readers will judge this report to be a useful contribution to the search for answers and accountability.

The following questions served as the frame of reference for this report:

- Prior to the pandemic, were biosafety conditions at laboratories studying bat coronaviruses in Wuhan subpar and potentially dangerous? If so, were the managers of these labs aware of such problems?
- Were senior leaders in the ruling CCP and PRC government concerned about biosecurity and biosafety as general matters, and/or particularly concerned about the biosafety conditions at laboratories studying bat coronaviruses in Wuhan?
- Is there evidence that a laboratory incident occurred in Wuhan concurrent with the initial outbreak of SARS-CoV-2 in 2019?
- When did the CCP leadership at the local and central levels first become aware that there was an outbreak of infectious disease? Did they know it was caused by a novel pathogen? If so, did they suspect a zoonotic spillover or a laboratory incident was most likely responsible for that outbreak?

SUMMARY OF FINDINGS

This study identified a variety of significant indicators that the PRC authorities and relevant figures in the scientific community possessed some level of awareness of an outbreak of infectious disease well in advance of the first disclosure of this information to the public on December 31, 2019. Information detailed in this report, including that derived from official Chinese sources, further indicates that a serious biocontainment failure or accident, likely involving a viral pathogen, occurred at the state-run Wuhan Institute of Virology (WIV) of the Chinese Academy of Sciences (CAS) during the second half of 2019 – approximately during the same period of time in which the available epidemiological evidence indicates that SARS-CoV-2 was introduced to the human population in Wuhan. In addition, indirect evidence suggests that the most senior leadership of the CCP likely had at least limited knowledge of this laboratory incident by no later than the middle of November 2019. This incident occurred within a climate of intense political pressure on the CAS to stand up the WIV's new flagship BSL-4 laboratory complex, the first of its kind in China, and to produce technological breakthroughs in short order that would free China of its so-called “stranglehold” problem.

Awareness of a laboratory incident seemed to have shaped the CCP leadership's response to SARS-CoV-2: a response characterized by strict controls of information, obfuscation, misdirection, punishment of whistleblowers, and the destruction of key clinical evidence. A closer look at the early days of the pandemic revealed that even when Beijing shared information with the international community – such as the initial notice of a pneumonia outbreak, the later admission that a novel coronavirus was its causal agent, and the publishing of its genomic sequence – it did so belatedly. In all three cases, Beijing possessed the relevant information for some time before sharing it, and disclosed it only when compelled to do so by circumstances beyond its control.

Awareness of a laboratory incident also seemed to inform Beijing's launch of a quiet, but determined, regulatory campaign in 2020 to strengthen biosafety practices nationwide. This campaign, documented here for the first time, was not incidental to, but rather was often billed as part of the package of emergency measures that PRC authorities were implementing to halt or slow the spread of COVID-19. This muscular and sustained campaign to regulate laboratory safety practices in 2020 and 2021 further stood in

contrast to the showy, but seemingly insubstantial, measures that were taken in early 2020 to regulate wet markets – the most likely site where a zoonotic spillover could have occurred.

Beijing's regulatory campaign was also discordant with its public statements to the international community that portrayed the prospects that the pandemic began as a result of a laboratory-acquired infection as extremely low, dismissing all suggestions to the contrary as farfetched, even conspiratorial. Such dismissal contradicted pre-pandemic statements made by the PRC Ministry of Foreign Affairs and senior officials of the People's Liberation Army (PLA) who warned on multiple occasions that technological advances in synthetic biology were increasing the risk of a devastating lab leak. Before the pandemic, Beijing saw nothing conspiratorial at all about considering the real risks that a laboratory escape of a dangerous pathogen could pose to public health. In fact, it called for measures to prevent such a scenario. Even after the outbreak, major differences were observed between how Beijing communicated internally to officials responsible for biocontainment laboratories and how it messaged externally to the Chinese public and the international community.

Just as Beijing was dismissing the lab leak theory of the origin of COVID-19 in international settings, internally, Beijing was warning its officials that the risk of laboratory-acquired infections with SARS-CoV-2 was significant, and ordering regulatory reforms to be implemented immediately to improve laboratory biosafety conditions. These biosafety regulatory reforms were rolled out in a manner that was concerted, systematic, and top-down, with Hubei provincial and Wuhan municipal authorities, among others, taking steps to carry out Beijing's directives in 2020 and 2021. The WIV also filed three patents between late 2019 and 2021 that looked like remedial measures addressing three different avenues by which an airborne pathogen could infect researchers in a laboratory setting. These innovations that the WIV sought to patent were technical solutions to specific biosafety problems, including those that WIV authors explicitly described as posing a serious risk for the escape of a highly consequential pathogen into the external environment.

A careful reading of reports from the WIV spanning more than a three-year period yielded a picture of a struggling institution: underfunded, underregulated, and understaffed. WIV leadership complained that some portion of their overworked staff

was also poorly trained, while some reports revealed a work culture of laxity toward safety matters and described difficulties adapting to the work environment at their newly constructed facilities. Persistent problems popped up month after month in report after report, casting considerable doubt on the WIV's claims of successful remedy. By their own admission, WIV researchers conducted experiments involving SARS-like coronaviruses, prone as they are to airborne transmission, in BSL-2 laboratory conditions with the relatively negligible protections required of researchers at that biosafety level. The WIV was almost an accident waiting to happen, and it appears that an accident, or perhaps accidents, did happen, and roughly concurrent with the initial outbreak of SARS-CoV-2.

Beginning in late 2018 and building like a crescendo throughout the months of 2019 that preceded the initial outbreak in Wuhan, a series of reports from the WIV indicated that inspections had identified "hidden dangers," "shortcomings," "nonconforming items," and various biosafety "problems" that were described alternatively as "foundational," "critical," and even "urgent." CCP cadres spoke of a rough start for the WIV's new BSL-4 laboratory complex in which they suffered from "no equipment and technology standards, no design and construction teams, and no experience operating or maintaining [a lab of this caliber]." In late July 2019, WIV leaders warned of "urgent problems we are currently facing," and by November, they "pointed to the severe consequences that could result from hidden safety dangers."

WIV researchers labored under the shadow of a political imperative to reduce reliance on imported "key and core equipment" in order to address China's so-called "stranglehold problem." The CCP leadership constantly impressed on WIV management their duty to produce scientific breakthroughs that would fuel "indigenous innovation," and assigned some portion of its staff to projects that were classified as state secrets. With unreasonable expectations that they must propel China to the forefront of the field in short order, compounded by the inherent pressures of working on secret projects for political overlords who also demanded that they reverse engineer essential equipment, or otherwise find technical workarounds just to avoid importing equipment from abroad, one could surely forgive WIV researchers if they faltered or failed. Scientists should not have to toil under such unfavorable conditions, but they did in Wuhan, and no doubt still do.

Counter to what one might expect, the political clock of SARS-CoV-2 began ticking before the epidemiological clock. In other words, Beijing was not just cognizant of the risk of a sudden outbreak of an infectious respiratory disease before it happened, but to some extent, it was preoccupied with guarding against this risk, especially as it pertained to biocontainment laboratories. For whatever reason, the authorities appeared to be preparing for what eventually happened well before, or just before, it happened. For example, at the top leadership's behest, the national legislature started working in earnest on biosecurity legislation in July 2019 that they had previously deemed a relatively low priority. Some of this preoccupation with preventing outbreaks of infectious disease can be attributed to the legacy of the SARS-CoV-1 epidemic of 2003, but as the reader will soon see, other elements are harder to explain with an appeal to history. Once the SARS-CoV-2 outbreak was underway, political prerogatives likewise set the cadence for the medical countermeasures that would follow.

Three years have now passed since the outbreak of a "pneumonia of unknown origin" became public knowledge. In that time, Beijing has displayed an uncharacteristic lack of seriousness toward determining the origin of the disease; the CCP is usually keen to snuff out sources of political and economic instability, and their actions have left no doubt that they regard COVID-19 as a major threat to stability. Beijing has further shown a tendency to resort to highly implausible claims about the origin, asserting it began anywhere other than China (often claiming it came from military laboratories in the United States). To further confuse the situation, Beijing has indulged in fantastical theories, such as the idea that the virus was imported to China through frozen seafood. Meanwhile, it has reacted to the actual outbreak on the ground with excessive seriousness and resolve, as if it confronted not merely a public health emergency, but rather a political crisis with the potential to shake the very pillars of one-party rule.

The inconsistency between Beijing's urgent and aggressive reaction to the outbreak itself and its lackluster efforts to ascertain the virus's origin – alas, its policy has been to actively frustrate international efforts to identify the origin and to punish PRC citizens who try to investigate on their own – suggests that Beijing already knows the origin, and fears that public confirmation of the origin could precipitate an existential crisis for the CCP and therefore must be avoided at all costs. The failure of local authorities to regulate the trade of wildlife at wet markets giving rise to the zoonotic spillover of a

novel human pathogen is a crisis that the CCP has weathered before. There is no reason to believe that they could not survive it again.

Risky research conducted at a state-run laboratory having inadvertently unleashed a novel pathogen, which then set in motion a once-in-a-century pandemic of almost unimaginable devastation, is a decidedly different and unprecedented problem with a path of culpability that leads unquestionably back to Beijing. When one further considers that this state-run laboratory was built to showcase China's growing scientific prowess, and at least some segment of its research involved state secrets, it is not hard to imagine the extreme embarrassment and sensitivity that such a scenario would elicit in CCP leaders, even if the accident had not precipitated a pandemic. Needless to say, we do not yet know with complete certainty that a biocontainment failure was responsible for the first human infection of SARS-CoV-2, but what we present below is a substantial body of circumstantial evidence that supports the plausibility of such a scenario.

SETTING THE SCENE: KEY BACKGROUND INFORMATION

BIOSECURITY AND BIOSAFETY IN THE CHINESE CONTEXT

A key concept discussed in this report is shengwu anquan (生物安全), a Chinese term that can encompass, depending on the context in which it is used, what is commonly meant by the two English terms “biosecurity” and “biosafety.”¹ Shengwu means “biological,” or “bio” in its abbreviated form, while anquan can mean “security” and/or “safety.” For example, shengwu anquan appears as “biosecurity” in the title of the law that PRC authorities have officially translated as the “Biosecurity Law of the People’s Republic of China.”² In the case of the BSL-4 laboratory in Wuhan, however, shengwu anquan is translated as “biosafety,” as the facility is formally known as the Wuhan National Biosafety Laboratory of the CAS.³ For an authoritative definition of shengwu anquan as it is understood in China, we refer the reader to multiple reports issued by the official Xinhua state news agency, which cited the following definition attributed to Wu Guizhen, the chief expert on the subject at the Chinese Center for Disease Control and Prevention (CCDCP): “Shengwu anquan is classified as non-traditional security. It includes emerging and sudden outbreaks of infectious disease, erroneous use and deliberate misuse of new biotechnology, biosafety in laboratories, and the loss of national important hereditary materials and genetic data, etc.”⁴

BIOTECHNOLOGY: A “FOCAL POINT” OF CHINA’S ECONOMIC STRATEGY

The biotechnology industry occupies a prominent place in the CCP’s strategic vision for China’s economy in the 21st century, and the success of that strategic vision will rest in part on the success of the WIV. As early as 1986, biotechnology was designated as one of seven major research areas under China’s national high-technology research and development (R&D) plan called the “863 Program,” which is regarded as its second most important civilian-military R&D program after the “Two Bombs and One Satellite” science and technology development plan of 1956-67 that led to the development of a nuclear bomb and intercontinental ballistic missile.⁵ In 1988, the PRC State Council laid out long-term plans aimed at developing biotechnology, which involved the construction of state-of-the-art laboratories and attracting foreign researchers and Chinese scientists

trained abroad to conduct experiments in China.⁶ By 2004, the State Council had set up a National Leading Group on Research, Development, and Industrialization of Biotechnology, with representatives drawn from the Ministries of Science and Technology, Education, Finance, Agriculture, and Health.⁷

In 2015, the State Council issued a national economic planning strategy aimed at high-tech industrialization and curbing dependence on foreign-made technology called “Made in China 2025.” The plan gave considerable prominence to the defense industry, particularly space and aviation,⁸ and categorized biopharmaceuticals as a “strategic focal point,” calling for attracting foreign investment and making ample use of international cooperation to stimulate high-end manufacturing of biopharmaceuticals and other advanced technologies in China.⁹ China’s 14th Five-Year Plan, covering the years 2021 to 2025, likewise seeks to establish China as the global leader in biotechnology, particularly synthetic biology, as well as six other science and technology fields to which Beijing is committing significant resources.¹⁰

The CCP is interested in synthetic biology for many reasons. Its high-tech surveillance system increasingly relies on the mass collection of genomic data to target specific individuals and ethnic groups it seeks to control, such as Tibetans and Uyghurs, whose homelands were annexed by the CCP.¹¹ Beijing further hopes that synthetic biology will meet the needs of a rapidly aging population and solve food supply challenges that it believes could result from climate change.¹² The PLA also considers synthetic biology to be a promising domain for military application.¹³ Before synthetic biology developed as a distinct field in China, the PLA already showed a general interest in biotechnology, particularly pharmaceuticals, both in pursuit of profit as well as military applications. In the 1990s, the PLA General Logistics Department invested heavily in the Sanjiu Pharmaceuticals Group, and by the end of that decade, the PLA was believed to be in charge of as many 400 pharmaceutical companies in China.¹⁴

The CCP’s determination to catapult China into the global lead in biotechnology development is evident in the substantial investment that the party-state is directing into the sector. Some observers have estimated that PRC authorities have collectively invested over US\$100 billion in life sciences R&D.¹⁵ The Ministry of Science and Technology (MOST) has set ambitious goals for the biotechnology sector, including a growth target for the sector as a whole to account for four percent of China’s total GDP

by 2020.¹⁶ As one biodefense expert put it in her testimony to the U.S. Senate Armed Services Subcommittee on Emerging Threats and Capabilities, “China has said repeatedly and forcefully, and they’re backing up their words with actions, that they intend to own the bio-revolution. And they are building the infrastructure, the talent pipeline, the regulatory system, and the financial system they need to do that.”¹⁷

WUHAN ASPIRES TO BECOME NATIONAL CENTER FOR BIOTECH RESEARCH AND BIOPHARM INDUSTRY

Wuhan, the capital of Hubei Province and the largest city in central China, is positioning itself to become a major base, not only for basic research in the life sciences, including synthetic biology, but specifically for biopharmaceutical production. In April 2019, the General Office of the Wuhan Municipal People’s Government issued a detailed 25-page development plan aimed at building a comprehensive health industry by 2035. That long-term plan described the BSL-4 laboratory at the WIV as a key driver for the development of the city’s broader health industry: “Bring into full play the driving effect of core institutions [such as] the Wuhan Institute of Biological Products, the Chinese Academy of Sciences P4 Biosafety Laboratory, and the Sinopharm Wuhan Plasma-Derived Biotherapies Company Limited.”¹⁸

In November 2019, the Hubei Provincial Development and Reform Commission issued its 2020 work plan that called for “actively putting forward proposals to build Wuhan into a comprehensive national production innovation center” and “actively planning to establish a cluster of national major science and technology infrastructure.”¹⁹ The provincial work plan cited the Wuhan National Biosafety Laboratory (BSL-4) complex at the WIV as a part of that cluster of science and technology infrastructure that would “raise indigenous innovation capabilities in critical fields.”²⁰ As early as 2014, Xi Jinping highlighted the importance of the WIV’s new lab, noting that “the construction of the P4 laboratory is of vital importance to Chinese public health.”²¹

THE LIFE SCIENCES IN THE PLA: THE ACADEMY OF MILITARY MEDICAL SCIENCES

The PLA, the armed wing of the CCP, has played an outsized role in the development of the life sciences since the founding of the PRC in 1949. Biological research conducted by the PLA takes place primarily under the auspices of the Academy of Military Medical

Sciences (AMMS), which was founded in 1951,²² and is currently led by Major General Zhang Shitao.²³ The AMMS has 11 subordinate research institutes, the most important of which for the purposes of this investigation is the Institute of Microbiology and Epidemiology in Beijing, which studies the pathogenesis of microorganisms, conducts epidemiological studies, and carries out basic and applied research in virology, parasitology, and bacteriology. The AMMS also engages in the development of pharmaceuticals and medical countermeasures, including vaccines, antibodies, antimicrobial and antiviral drugs, and diagnostic testing.²⁴

In 1993, the PRC declared to the Biological and Toxin Weapons Convention (BWC) that the AMMS Institute of Microbiology and Epidemiology was a “national defensive biological warfare R&D program.”²⁵ In December 2021, the U.S. Department of Commerce added the AMMS to its export blacklist over concerns about its misuse of emerging biotechnologies, including gene editing, human performance enhancement, brain machine interfaces, and biological materials, to support military applications.²⁶ As this report will later demonstrate, the AMMS Institute of Microbiology and Epidemiology is an important research partner of the WIV.

In 2017, the AMMS was placed under the authority of the PLA Academy of Military Science (AMS), which reports directly to the Central Military Commission chaired by Xi Jinping.²⁷ This organizational restructuring was part of PLA reforms first launched by Xi in late 2015²⁸ aimed at 1) spurring technological innovation by blending AMS work on strategy and doctrine with the applied research conducted by a wide range of PLA science and technology institutes like the AMMS,²⁹ and 2) better leveraging science and technology as key enablers of combat capabilities.³⁰ In addition to the AMMS, the reform also brought under the AMS umbrella the PLA Institute for Chemical Defense (ICD),³¹ the original establishment of which was authorized by Mao Zedong in 1950 to serve as “the cradle of the Chemical Defense Corps.”³² The Chemical Defense Corps has historically engaged in offensive chemical warfare operations³³ as well as exercises that simulate defensive tactics against chemical warfare.³⁴ In 2019, the PLA Daily described the ICD as China’s “only professional college to train nuclear, biological, and chemical defense personnel,” and the “nuclear, biological, and chemical emergency response support center” for the PRC government and the PLA.³⁵

The AMMS has historically spearheaded the construction of biocontainment labs in China. The AMMS built the PRC's first laboratory that met modern BSL-3 standards.³⁶ While multiple Chinese language reports date the creation of the first BSL-3 lab to 1987, an English language source written by a WIV expert placed it in "the early 1980s."³⁷ Chinese sources are also inconsistent on the matter of what exactly the lab was built to study. Some claim that the first BSL-3 lab was designed to study the transmission mechanism of epidemic hemorrhagic fever viruses,³⁸ while others maintain that HIV was the primary subject of its research.³⁹

We could not find any open-source document that disclosed where the PLA built this first BSL-3 lab. The time of construction, however, preceded two outbreaks of hemorrhagic fever in the late 1980s in an area of the Xinjiang Uyghur Autonomous Region (XUAR) where such diseases had never been observed before. Soviet intelligence believed that these localized outbreaks were caused by a laboratory accident that occurred during the process of weaponizing viral pathogens.⁴⁰ In 1999, a Taiwanese expert also claimed that the PLA had built a biological weapons facility in the Tarim Basin near the Lop Nur nuclear testing site in the XUAR.⁴¹ In the late 1980s, Soviet intelligence reportedly possessed satellite imagery of a biocontainment lab and a large fermenting plant close to Lop Nur.⁴² It is not clear if this facility in the XUAR was the BSL-3 lab of the AMMS, or some other undisclosed PLA installation.

The U.S. Department of Defense has long assessed that the PLA maintained an offensive biological warfare program from the 1950s until at least the late 1980s, and during this time, had probably weaponized ricin, botulinum toxins, and the causative agents of anthrax, cholera, plague, and tularemia.⁴³ A considerable amount of research has also been conducted in China on other potential biological warfare agents, including Q fever, western and eastern equine encephalitis, and psittacosis, among others.⁴⁴ In 1993, U.S. intelligence officials told the Washington Post that Beijing may have been expanding its offensive biological weapons program – a conclusion based in part on the finding that the PLA was pursuing research on biological agents at two ostensibly civilian-run research centers that were, in fact, controlled by the PLA.⁴⁵ In 2007, the Defense Intelligence Agency testified to the U.S. Senate that it believed Beijing "continues to maintain some elements of an offensive biological weapons program."⁴⁶

To this day, the PRC has not provided sufficient information to the international community that would allow a determination to be made whether the PRC eliminated its historical biological warfare program, and Beijing has never acknowledged publicly or privately the existence of its historical biological warfare program.⁴⁷ The PRC continues to engage in a wide range of biological activities with dual-use applications,⁴⁸ both at formal PLA institutions such as the AMMS as well as at ostensibly civilian research institutions like the WIV.⁴⁹ As recently as 2021, the United States expressed BWC compliance concerns with respect to toxin R&D being conducted at military medical institutions in China because of their dual-use applications and their potential as a biological threat.⁵⁰

THE PLA'S INTEREST IN THE WEAPONIZATION OF BIOTECHNOLOGY

The significance of the rapid development of biotechnology from the 1990s until the present has not been lost on PLA strategists. Many of them have analyzed the potential military applications of biotechnology and argued that biotechnology is transforming the nature of warfare in the 21st century. In 2005, PLA Colonel Guo Jiwei, a professor at the Third Military Medical University, highlighted the human genome project, bioinformatics, proteomics, and transgenic technology as possessing “great value in military affairs.”⁵¹ Guo further explained: “We can use many modern biotechnologies directly as a means of defense and attack, and with further development, they probably will become new weapons systems.”⁵² In 2010, Colonel Guo published a book called *War for Biological Dominance* that further developed his case that various applications of biotechnology would profoundly shape warfare of the future.⁵³

The PRC Ministry of Foreign Affairs submission to the BWC in 2011 provided another important window into “current Chinese thinking on the development of new science and technology,” as it detailed dual-use concerns pertaining to emerging lines of research such as the creation of “man-made pathogens,” “population-specific genetic markers,” and “targeted drug-delivery technology [that make] it easier to spread pathogens.”⁵⁴ For the purposes of this study, we would like to highlight that the PRC submission showed an acute awareness of the potential danger posed by the techniques of synthetic biology that allow researchers to engineer chimeric viruses. The PRC specifically warned that a laboratory accident involving such an artificial pathogen could cause tremendous harm: “Accidental mistakes in biotech laboratories can place mankind in great danger. Synthetic biology in some civilian biotechnology research and applications may

unintentionally give rise to new, highly hazardous man-made pathogens with unforeseeable consequences.”⁵⁵ It further noted that “research into genetic differences and susceptibility to pathogens among different populations and species can lead to the creation of racial bioweapons based on genetic differences between races.”⁵⁶

The PRC submission to the BWC specified four ways in which the rapid development of biotechnology may “significantly increase the destructiveness of biological weapons”:

1. Microbial genomic research can enhance the virulence or pathogenicity of a pathogen by modifying its antigenic properties....
2. Supergenes conferring resistance to antibiotics can be synthesized by DNA recombination technology, making pathogens highly drug-resistant. Pathogens with detoxifying genes can also be produced, as can pathogens that can evade recognition and attack by the immune system, rendering vaccines and medicines useless....
3. RNA interference can inactivate specific genes in the body, inhibit expression of important bodily proteins, disrupt physiological function and heighten the effects of a bioweapon attack....
4. Foreign genes or viruses can be introduced into the target population asymptotically by means of gene therapy vectors, enabling a biological weapon attack to be mounted covertly....⁵⁷

A 2014 interview with General Liu Yazhou, the political commissar of the PLA National Defense University (NDU), provided further insight into the PLA’s fixation with biotechnology: “Biologized warfare is ready to take the stage.... After the mechanization [of war] was the informatization [of war], after informatization, then it will be the biologization [of war].... Science and technology is first and foremost applied most broadly in military affairs. Now, what is it that is most flourishing, and developing the most swiftly and violently? It is the life sciences!”⁵⁸

General Liu went on to explain: “Scientists for a long time have been tirelessly exploring and seeking breakthroughs, leading biotechnologies such as gene chips [DNA microarray] and protein chips [protein microarray] to reach maturity day by day. Bioengineering, such as enzyme engineering and cell engineering, is also emerging in an endless stream. The organic ‘grafting’ of biotechnology to bioengineering, while benefiting the lives of mankind, also simultaneously induces labor for the birth of one batch of biological

weapons after another.”⁵⁹ Liu concluded that “predictably, biologized warfare is on the verge of reaching a critical juncture.”⁶⁰ It is worth noting that Liu’s influence extends beyond the PLA to the broader CCP, as Liu’s marriage to the daughter of Li Xiannian, one of the Eight Elders of the CCP, places him in the exclusive circles of the CCP’s princelings.⁶¹

In 2015, Major General He Fuchu, then-president of the AMMS, predicted that biotechnology would become the new “strategic commanding heights” of national defense.⁶² He, whose research focuses on genomics and bioinformatics, was subsequently promoted to vice president of the newly expanded AMS and appointed to serve on the Central Military Commission’s Science and Technology Committee – personnel decisions that appear to reflect the strategic priority that the CCP has placed on developing biotechnology.⁶³ In 2012, an official PLA-run publisher issued a book by Senior Colonel Du Chao, a professor at the PLA Nanjing Army Command Academy, titled *China’s Future War*.⁶⁴ Du’s book made the case that the world’s great powers, including the United States, had not stopped R&D of biotechnology and bio-warfare agents, and warned that biological weapons, including viruses, toxins, and genetic weapons, were powerful tools of war that could achieve a great effect, even if deployed in small quantities.⁶⁵

In 2017, General Zhang Shibo, summing up his views on technology and warfare in his final book before his retirement as president of the PLA NDU, assessed that biology was one of seven “new domains of warfare,” and argued that “modern biotechnology development is gradually showing strong signs characteristic of an offensive capability.” He further raised the possibility that “specific ethnic genetic attacks” could be developed using gene editing technologies.⁶⁶ General Zhang is an influential figure. Before becoming president of the PLA NDU, Zhang commanded combat units at every level of the PLA Army. He was commander of the PLA garrison in Hong Kong and the Beijing Military Region, two of the most critical jobs in the PLA. He also sat on the CCP Central Committee for a full decade, initially as an alternate and later as a full member.⁶⁷

Zhang’s and Du’s views are not simply their own. They represent two distinct levels of the PLA: the former being the highest level of military education for senior leaders and generals, and the latter being mid-level operational and professional training for officers. Importantly, the educational goals that they articulated with regard to biotechnology

were the same. Future and current PLA leaders are being taught that the United States (and Russia, India, and Taiwan) are engaged in secret programs to produce various biological weapons, and that the use of these weapons against China is almost inevitable. Both Zhang and Du remind their readers that China suffered heinous biological attacks from Japan during World War II, and argue that the United States is the country that poses the greatest threat to China because it used chemical weapons in Vietnam and is the only country to have used nuclear weapons in history.⁶⁸

As further evidence of the representativeness of Zhang's and Du's views, we note that the same year that Zhang's book was released (2017), a new edition of the foundational text on PLA strategy, *The Science of Military Strategy*, was also published. For the first time, the textbook included an entire section about biology as a domain of military struggle and pondered the prospects for new forms of biological warfare, such as "specific ethnic genetic attacks."⁶⁹

The view that "genetic weapons" are the future of warfare and that the United States is plotting to use them against China is commonly held among PLA strategists. Shi Haiming, professor at the PLA National University of Defense Technology, alleged in a November 2017 interview that Washington was collecting genomic samples of Russians for use in developing genetic weapons.⁷⁰ A 2014 PLA Daily piece likewise claimed American forces had prepared biological weapons for use against Chinese and Southeast Asians in the 1960s,⁷¹ while a 2016 piece claimed the Pentagon was currently building a genomic database targeting Chinese and Arabs.⁷² Another 2016 piece blended historical and contemporary allegations, claiming Washington employed Imperial Japan's Unit 731 to research and produce biological agents on a large scale after U.S. forces occupied Japan at the end of World War II, and is developing genetic weapons in the present era.⁷³

PLA analysts make such allegations about the United States in order to frame their calls for the PLA to take action in response; in Shi Haiming's case, he advised that "special research should be conducted on the military strategies, ways, and means that may be implemented in the future biological information war, and operational contingency plans should be formulated as soon as possible."⁷⁴ Shi made the following observation about what weaponizing such technology would involve: "In a word, it is simply using DNA recombination technology to alter a bacterium or virus to make those that are non-pathogenic [to humans] pathogenic, and to make those diseases that vaccines or

medicines can be used to prevent and treat into ones that are difficult to prevent and treat. Putting this kind of biological warfare agent inside of a device that can discharge it constitutes a genetic weapon.”⁷⁵

Four days after the PLA Daily published Shi’s interview in 2017, it ran a piece by PLA AMMS researcher Cao Shiyang that reiterated the themes developed by Zhang, Du, and Shi, and amplified the allegation that the U.S. military was collecting biological samples to design bioweapons targeted at foreign adversaries.⁷⁶ “Genetic weapons refer to the modification of the genetic code of pathogenic microorganisms through gene editing technology and the development of a new generation of biological weapons that can attack the enemy at the genetic level,” Cao explained, “In simple terms, gene editing technology is equivalent to genetic ‘scissors,’ which can splice genetic fragments of one organism into another organism in accordance with the subjective wishes [of the technician], thereby changing its physiological characteristics. It is precisely in this manner that genetic weapons modify genes to obtain new pathogenic microorganisms, thereby invalidating the other party’s vaccine bank.”⁷⁷ Cao offered further insight into the challenge of developing medical countermeasures for man-made chimeric viruses: “Owing to the fact that genetic weapons are new viruses and new bacteria that have been ‘cut out,’ only the designer knows the genetic code, and it is difficult for the other party to promptly decipher and develop a new vaccine to fight it. Even if they update their vaccine bank, an unending stream of new genetic weapons is ‘ready and waiting to march.’”⁷⁸

Potentially interesting for the purposes of this study, Cao Shiyang warned that bioengineered viruses could be accidentally released: “If there is improper operation, bad luck, or a leak occurs during the transportation process, you hurt your own people. It is tantamount to ‘lifting a stone only to drop it on your own feet.’”⁷⁹ A February 2019 piece on “The Militarization of Biotechnology” written by a researcher in the state-owned defense industry also recognized that genomic editing of viruses and synthetic biology could harm public health by “bringing about a series of significant security threats such as the proliferation of biological weapons, terrorist attacks, cross-species infections of pathogens, and the transmission of viruses across regions.”⁸⁰ By December 2019, a PLA AMMS researcher and CAS researcher were implying that Cao’s proverbial stone had been dropped, as they published a piece in a CCP official newspaper warning about the

“double-edged sword” of biotechnology, including “dangers from domestic supervision and regulatory holes.”⁸¹

In keeping with the PLA’s assessment of the potential of CRISPR-Cas9 and other gene editing technologies to be used to create weapons targeting the genetic vulnerabilities of specific types of people, PLA strategists have consistently called on Beijing to restrict foreign access to Chinese genetic data and material, and to conduct more domestic research focused on mapping out the genome of the Chinese people to determine any unique genetic vulnerabilities that could be exploited by an adversary developing a biological agent, and conversely, to advance their own understanding of biological agents that would harm other races, but not Chinese people.

In a November 2018, two experts at the PLA National University of Defense Technology wrote a piece arguing that the Chinese public was worried about their genomic data leaking to foreign countries, and explained the worry thusly: “The reason is very simple. With a sufficiently large quantity of human genetic samples, it is possible for some countries to develop specialized ‘genetic weapons,’ particularly ‘racial genetic weapons,’ perhaps casting a new shadow to hang over all of our heads, leaving us no choice but to defend against it.”⁸² The perceived risk that genetic weapons could be developed to target the Chinese race was not a passing reference, but rather the central theme of the piece: “Research indicates that human DNA is 99.7 percent to 99.9 percent identical, and it is this small minority of differences that is the key to differentiating between the races. Therefore, every ethnic group and race has unique genetic traits, and theoretically speaking, it is possible to develop genetic weapons predetermined to kill and injure targets of a particular race....”⁸³

In 2019, the authorities acted on the PLA’s advice. On March 20, the State Council passed a revised version of the “Human Genetic Resources Management Regulations.”⁸⁴ The updated regulations significantly strengthened the state review process for any research done with international institutions or individuals abroad that involves the use of genetic material. It also sought to clarify and further standardize procedures for the use of genetic material in domestic R&D as a matter of “public health, state security, and the public interest.”⁸⁵ The CCP’s embrace of the PLA’s view on the inevitability of what might be called the racialization of biological warfare was also evident in the PRC’s official submission to the BWC in 2011. It contained an entire subsection titled

“Systems biology further revealing population-specific genetic markers.”⁸⁶ The PRC submission pointed out how “genome-wide association studies have found variations in the genes for susceptibility to infectious diseases among different populations; epigenetic studies further indicate the existence of population-specific genetic markers of susceptibility to disease.” The conclusion drawn tracks with the PLA’s view: “It can also create the potential for biological weapons based on genetic differences between races.”⁸⁷

THE PLA’S INTEREST IN CORONAVIRUSES

Now that we have established the PLA’s general interest in biotechnology and its considered view that biotechnology is transforming the nature of modern warfare, we should explore the question of whether the PLA had any specific interest in coronaviruses, and if so, how that interest may or may not have related to research conducted at the WIV. In August 2015, the official publishing house of the PLA AMMS published a book titled *The Unnatural Origin of SARS and New Species of Artificial Viruses as Genetic Weapons*.⁸⁸ The book’s primary thesis is that SARS-CoV-1 did not emerge naturally through a process of zoonotic spillover, but rather was a genetic weapon, that is, a chimeric virus artificially engineered to infect humans.⁸⁹

The authors pointed to various epidemiological and molecular oddities of the virus as supposed evidence of its unnatural origin, such as the unprecedented speed of its attrition and disappearance from human circulation, the failure to isolate a complete strain of the virus in a natural reservoir or intermediary, a mutation rate that was inconsistent with natural evolution, and a pattern of “reverse evolution” observed in accessory genes that are supposedly unique to the virus.⁹⁰ The authors interpreted an estimate published by WIV researchers that the interspecies transfer of the SARS-CoV-1 lineage from bats to the amplifying host (e.g., civets) happened roughly 4.08 years before the SARS outbreak⁹¹ as supportive of their thesis: “SARS-CoV could not have taken place in the natural world during this period of just over four years of evolutionary time. It could have only appeared in an artificial setting, by [the application of] man-made technology....”⁹²

The book described experimental techniques that a virologist could use to create chimeric viruses like SARS-CoV-1:

1. Apply the latest genetic modification technology to induce recombination between an animal virus and a human virus, and then passage it through tissue cells that are most similar to human cells to strengthen the pathogenicity of the virus to animals with close affinity to humans until the point that the virus can directly attack humans.
2. Take an animal pathogen (at present this is mostly viruses) and use various methods and channels to attack animals with [naturally] high affinity with humans or animals with cellular receptors that are very similar to humans, and conduct various kinds of passaging many times until the pathogen ultimately adapts to transmit among the intended group of animals, and then go through the same procedures until it induces partial adaptation to humans. The authors are provisionally calling this “adaptive trials among animal groups for an artificial human pathogen.”
3. Combine the two methods described above.⁹³

The authors highlighted a famous gain-of-function study with avian influenza conducted by the University of Wisconsin-Madison and the University of Tokyo in 2012 as an important case study of how passaging a virus through ferrets could confer the properties needed for highly efficient transmission in humans via respiratory droplets.⁹⁴ The aerosolization of biological agents is discussed multiple times in the book as an important element of engineering chimeric viruses as genetic weapons,⁹⁵ and a section that outlines the ideal properties of a biological agent identifies one such desirable trait as the ability to transmit through aerosols between 1-5 mm in size.⁹⁶ For the reader’s reference, SARS-CoV-2 is transmitted via respiratory droplets and aerosols, and its genes have been detected in sampled aerosol particles measuring between 1-4 mm or even less in size.⁹⁷

For the purposes of this study, it is important to note that the techniques described above have been routinely used by researchers at the WIV and elsewhere to artificially construct novel pathogens.⁹⁸ These techniques would not vary substantially whether the purpose of the researcher were benign, such as pathogen discovery, or malign, such as developing a bioweapon. As the authors of this book readily acknowledged, this type of research is inherently dual-use, making it difficult to distinguish between biological research for defensive and offensive purposes.⁹⁹

The authors do not state that the PLA is developing chimeric viruses as genetic weapons, but they do describe an international threat environment in which they are convinced that others are doing exactly that. The authors believe that the number of countries that possess biological weapons is increasing,¹⁰⁰ that biological weapons have been used in localized conflicts,¹⁰¹ that “various types of terrorists” are seeking to develop viruses as genetic weapons,¹⁰² and that state actors that the PLA regards as its adversaries, including the United States, have maintained lines of research related to bioweapons to the present day.¹⁰³ They also acknowledged that the PLA was researching the differences between SARS-CoV-1 and MERS that they believed demonstrated that SARS-CoV-1 was a genetic weapon as opposed to the naturally occurring MERS.¹⁰⁴ While arguing that SARS-CoV-1 was the only virus that they could prove was developed as a genetic weapon, the authors said they “could not preclude the possibility” that H7N9, the Asian Lineage Avian Influenza A Virus, was also a genetic weapon of the ecological variety.¹⁰⁵

The authors of the book further argued that the new generation of genetic weapons differ substantially from traditional biological weapons because the former are based on new artificially engineered pathogens that are not found in nature while the latter simply weaponized naturally existing pathogens in their original, or a slightly modified, form.¹⁰⁶ The authors see the potential scope for the use of chimeric viruses as much broader than the wartime uses to which traditional biological weapons have been confined: “The purpose of using modern genetic weapons is not primarily for military motives but rather as an important terror threat, [and to meet] political and regional or international strategic requirements.”¹⁰⁷ Another passage describes biological weapons as relevant not only in the context of international military conflict but also to the more general context of “political struggle.”¹⁰⁸

Deniability is cited as a major advantage of genetic weapons: “If one uses a modern genetic weapon, it will be stealthy and difficult to collect evidence; no matter if academic evidence is provided, or even empirical proof of the virus or the animal, there are still a hundred and one ways to deny this too, to block and suppress, and to leave international organizations and advocates for justice utterly helpless.”¹⁰⁹ The authors note that the aggressor’s efforts to evade responsibility will be aided by skepticism among the victims of the attack:

Modern genetic weapons are much more intelligent [than traditional bioweapons] and leave the targeted area completely unsuspecting [of what happened], unsuccessful in their prevention efforts, and [they] even throw their thinking into a state of chaos in which they cannot understand the true situation. Even more horrible to contemplate, and which leaves people distressed, is the likelihood that some individuals will blindly believe that the conditions and motives do not currently exist to produce and release a “modern genetic weapon.” The result will be that these people will unintentionally obstruct to one extent or another the search for the origin of the release of the genetic weapon.¹¹⁰

The authors assert that a skilled virologist could use genetic engineering to create a new strain of influenza with artificial modifications analogous to natural mutations, thus rendering it difficult to discern its artificial origin.¹¹¹ Their view that the stealth nature of genetic weapons is an appealing aspect of these weapons is found in many other PLA writings. For example, Shi Haiming, professor at the PLA National University of Defense Technology, said in a 2017 interview that “genetic weapons are difficult to detect, difficult to predict and prevent, [and] difficult to isolate, and the production costs are exceedingly low....”¹¹²

Some degree of authoritativeness can be ascribed to this book on the basis of its acceptance by an official PLA publishing house, and its production and editing through a collaborative process involving 18 experts, 16 of whom are officers working at the AMMS or other PLA research centers. One of the book’s two editors-in-chief, Xu Dezhong, reportedly advised the Central Military Commission and health authorities during the SARS-CoV-1 epidemic, briefing them 24 times and preparing three reports on the outbreak.¹¹³ The second editor-in-chief, Li Feng, served as the deputy director of the Bureau of Epidemic Prevention in the PLA General Logistics Department.¹¹⁴ Yang Ruifu of the PLA AMMS Institute of Microbiology and Epidemiology, a deputy editor of the book, has lectured at the WIV and partnered with its researchers. In December 2016, the WIV reported about a special presentation delivered by Dr. Yang on “investigating the origin of pathogens and rapid testing.”¹¹⁵ It was held in a large lecture hall and well-attended by WIV researchers and graduate students.¹¹⁶ Yang has a long record of research collaboration with the WIV,¹¹⁷ having reportedly coauthored at least a dozen scientific papers with WIV researchers,¹¹⁸ and served as a reviewer for Shi Zhengli’s journal *Virological Sinica* between November 2019 and October 2020.¹¹⁹ Far from being

a fringe figure, Yang received a meritorious service award directly from Xi Jinping in his role as Central Military Commission chairman less than six months before this book was published.¹²⁰

THE CAS AND THE PLA: A LONGSTANDING PARTNERSHIP

The CAS is the PRC's premier organization for science and technology R&D, and while it may bear a superficial resemblance to academic institutions in the West, the CAS is distinct in important ways.¹²¹ As one German Sinologist cautioned in a seminal work on the CAS: "The portrayal of the Chinese Academy of Sciences is a difficult task because traditions and the conditions for scientific research in China differ from those in the Western world in almost every respect."¹²²

First of all, the CAS is massive, boasting some 61,000 personnel spread across 104 research institutes, 12 branch academies, and two universities,¹²³ and thus dwarfs similar academic institutions in the West. More than 85 percent of China's large-scale science facilities belong to the CAS.¹²⁴ It operates on a budget of approximately RMB 42 billion (US\$6.7 billion) with a majority of its funds coming from the PRC government.¹²⁵ This study examined CAS closely because the WIV is a CAS research institute. The full, formal name of the WIV is the "Chinese Academy of Sciences Wuhan Institute of Virology."¹²⁶ The WIV answers directly to the Wuhan branch office of the CAS and the CAS headquarters in Beijing, not to the Wuhan municipal authorities. The CAS answers directly to the State Council.

Second, the CAS is not only state-funded, but it is also state-run. The CAS is essentially the R&D arm of the PRC government in the natural and applied sciences.¹²⁷ Although many research institutions outside of China likewise rely heavily on state support, they generally enjoy considerable autonomy to pursue research as they see fit. In China, by contrast, CAS and other state-run research institutions exist, first and foremost, to serve the party-state and its top-down approach to research and innovation.¹²⁸ The CCP does not regard them as independent entities.¹²⁹ The CAS founding charter describes its mission thusly: "Under the leadership of the Central Committee of the Chinese Communist Party and the State Council..., [the CAS] takes part in the development of science and technology and contributes to the building up of a modern, socialist, and strong state."¹³⁰ The CAS is one of 18 government and party entities whose personnel

matters are overseen by the Talent Work Coordination Small Group of the CCP Central Committee's Organization Department.¹³¹

Third, the CAS is not a purely civilian institution. CAS researchers work for and with the PLA in various ways. The CAS is civilian insofar as it is subordinate to the State Council, the highest executive organ of state power and roughly the equivalent of the cabinet, rather than to the Central Military Commission.¹³² The civilian command structure of CAS does not, however, preclude the PLA from having a role at the CAS, nor does it exempt the CAS from the political imperative to advance the PLA's research agenda. To the contrary, much of the work done at the CAS contributes to products for military use.¹³³

The CAS has had "an extensive history of involvement in the development of the country's most advanced civilian and military technologies since its inception," according to one expert on China's defense industry.¹³⁴ Classified studies are conducted at the CAS on a routine basis.¹³⁵ The CAS research agenda is largely dictated to it by the party-state, and the pursuit of explicitly dual-use goals and applications is common.¹³⁶ CAS researchers regularly collaborate with PLA counterparts,¹³⁷ hosting them as visiting researchers at CAS facilities,¹³⁸ participating in joint trainings,¹³⁹ and engaging in professional exchanges.¹⁴⁰

The PLA has hired CAS experts to work as technical advisers for various military platforms, including missiles, radar, communications, and information technology.¹⁴¹ In 2009, a formal program for experts at the CAS and the Chinese Academy of Engineering (CAE), the sister organization of CAS, to mentor select military personnel was established, ensuring that significant numbers of CAS researchers are involved in the PLA's most important science and technology projects. By 2015, 401 CAS and CAE academicians, 78 of whom were assigned to the PLA Air Force alone, and many more CAS researchers who lack the academician title, had been recruited into the PLA mentorship program.¹⁴² The U.S. government has known for many decades that the CAS played an integral role in developing China's nuclear weapons,¹⁴³ and the historic military contributions of the CAS are a point of pride openly discussed by PRC officials to this day.¹⁴⁴ This knowledge, however, seems to have faded from public memory in the West, as ties with the PRC gradually grew closer after the establishment of

diplomatic relations, and the temptation to avoid difficult questions about PRC interlocutors became stronger.

The history of integrating civilian CAS scientists into military research projects and weapons development programs stretches back to the beginning of the PRC. Nie Rongzhen, a celebrated PLA marshal who fought in the communist revolution and supervised the development of a nuclear bomb,¹⁴⁵ was perhaps the first PLA leader to mobilize civilian researchers for military purposes, as Nie organized problem-solving “strike teams” composed of the best civilian talent to tackle the research challenges of the nuclear and missile programs.¹⁴⁶ Two-thirds of CAS researchers were assigned to work on the PLA’s satellite, missile, and nuclear weapons programs during the 1950s and 1960s.¹⁴⁷ CAS researchers led by nuclear physicist Zhou Guangzhao ran the final check of calculations before the PLA conducted its first test of an atomic bomb.¹⁴⁸ The scientists widely credited for the success of the PLA’s satellite, missile, and nuclear weapons programs, such as Deng Jiaxian, Qian Sanqiang, and Qian Xuesen, were all associated with the CAS, and benefited from long stints of study abroad and/or collaboration with foreign scientists.¹⁴⁹ PRC founder Mao Zedong reportedly said to Qian Xuesen: “I’ve heard that the Americans view you as a five-star general! The way I see it, [and] as far as we are concerned, you are much more powerful than a five-star general.”¹⁵⁰

Four CAS scientists, Wang Daheng, Wang Ganchang, Chen Fangyun, and Yang Jiachi, birthed the idea for the 863 Program, the PRC’s long-term military science and technology plan, which prioritized dual-use R&D in seven high-tech fields, including biotechnology, and sought to embed military programs within China’s civilian science and technology base.¹⁵¹ They convinced CCP paramount leader Deng Xiaoping to launch the program in 1986 and give it ample funding. These four CAS researchers “ranked among the small core of Chinese strategic weapons pioneers of the glory years under Mao.”¹⁵² They “explicitly evoked China’s past achievements in strategic weapons” to justify the need for the program, which is ongoing today.¹⁵³

The “father of China’s nuclear submarines,” Huang Xuhua, was likewise a CAS academician, and he was described as a model for WIV researchers to emulate during a training held at the WIV in October 2018.¹⁵⁴ Drawing a parallel between the WIV’s work and China’s nuclear submarine program makes sense in the historical context of the CAS

supporting the development of military technologies, particularly in light of Wuhan's specific role in designing China's nuclear submarines. The Wuhan Second Ship Design and Research Institute, also known as the 719 Research Institute,¹⁵⁵ contributed directly to the design of China's first nuclear submarine.¹⁵⁶ CAE academicians are counted among the personnel at the 719 Research Institute.¹⁵⁷

CAS personnel can likewise be found embedded within PLA institutions. Of the 749 senior CAS researchers who bore the distinguished title of "academician" in 2015, 54 of them worked for the PLA or the defense industry.¹⁵⁸ CAS academicians can be found at the Dalian Naval Academy, the Air Force Medical University in Xi'an, the Strategic Support Force Space Engineering University in Beijing, and the Strategic Support Force Information Engineering University in Zhengzhou.¹⁵⁹ CAS academicians also reportedly reside at the China Aerodynamics R&D Center, also known as the 29th Testing and Training Base (63820 Unit) in Sichuan Province, and the Northwest Institute of Nuclear Technology in Xi'an.¹⁶⁰ The Central Military Commission tapped Lieutenant General Liu Guozhi, a CAS physicist and director of the China Nuclear Test Base, to head its new Science and Technology Committee formed in late 2015 to carry out Xi's reforms.¹⁶¹ The chief engineer of the Xi'an Satellite Control Center Technology Department, Li Jisheng, is a CAS academician.¹⁶²

In summer 2015, the State Administration for Science, Technology, and Industry for National Defense created a Development Strategy Committee to advise the CCP leadership on its long-term defense R&D expenditures for military science and technology. Ten academicians from the CAS and its sister organization, the CAE, were selected to serve on the committee.¹⁶³ Career PLA scientists can also hold appointments as CAS academicians. A famous example is Wu Zuze, the former president of the PLA AMMS and the "father" of the study of blood generating stem cells in China,¹⁶⁴ who became a CAS academician in 1993.¹⁶⁵

MILITARY-CIVIL FUSION STRATEGY: THE CATALYST FOR AN EXPANDING PLA-CAS PARTNERSHIP

While the PLA's utilization of civilian expertise to advance its research agenda is not a new phenomenon, the emergence of a doctrine called Military-Civil Fusion (MCF) has placed greater emphasis in recent years on the systemization of this practice across the national economy and civilian research apparatus. CCP leaders, particularly Xi Jinping,

view the current decade as a potentially decisive period in a zero-sum race with the United States for global technological dominance in both civilian and military domains.¹⁶⁶ In March 2015, Xi elevated MCF to a national development strategy, a move aimed at winning this technological race, after he warned the PLA in December 2014 that China was lagging behind the United States.¹⁶⁷ In 2017, Xi sought to energize the implementation of the MCF strategy by establishing the Military-Civil Fusion Development Commission (MCFDC), chaired by Xi himself, under the CCP Central Committee. Xi has used the MCFDC to overcome resistance from vested interests, especially state-owned defense contractors, delineate MCF roles and responsibilities across the government and the PLA, promulgate policy directives, and compel provincial and municipal governments to form local-level MCF development committees,¹⁶⁸ but MCF remains a work in progress.

MCF first appeared in a CCP work report in 2007 under Hu Jintao's leadership. Xi's full embrace of MCF reflects a consensus between the current and previous CCP leadership that MCF is the "new prescription" for achieving the goal of making China affluent and militarily dominant in the 21st century.¹⁶⁹ MCF provides the essential backdrop against which the PLA's involvement with the CAS, including the WIV, should be understood, because CCP and PLA leaders view MCF as the primary force that will drive the technological innovation needed to surpass the United States.¹⁷⁰ As Hou Guangming, a Chinese scholar of MCF, explained: "From the state's perspective, the global revolution in military affairs continually promotes upgrades in high-tech weaponry, and the core of military competition is changing toward science and technology."¹⁷¹

MCF stems from a widely held view among PLA strategists that the blurring of the lines between civilian and military technology is a fundamental characteristic of modern warfare, with upwards of 80 percent of technologies powering the equipment used by modern militaries being dual-use in nature.¹⁷² MCF seeks to break down barriers between civilian and military institutions, and to mobilize the former in service of the latter.¹⁷³ MCF facilitates the two-way transfer of technology, resources, information, and personnel between military and civilian entities.¹⁷⁴ Bai Chunli, former president of the CAS, summed it up well when he observed: "The boundary [between the civilian and military] in aspects such as personnel, platforms, and technologies gets blurrier by the day [because of] the deep fusion of military and civilian science and technology and its coordinated innovation."¹⁷⁵

MCF's mobilization of civilian resources for military purposes is a policy response to the practical challenges of trying to build a high-tech military. One such challenge is the PLA's persistent shortage of personnel with science, engineering, and technical backgrounds.¹⁷⁶ As Xi Jinping noted in 2017, "the scale of skilled personnel and troops in our military has improved greatly, but there is an extreme shortage of strategic scientists and talented science and technology leaders, and a complete lack of top talent."¹⁷⁷ By utilizing expertise based at civilian research institutes, universities, and the private sector to develop dual-use technologies, the PLA hopes to mitigate the effects of its shortfall in personnel with science and technology backgrounds. Another challenge is the massive level of R&D spending that is needed to establish technological preeminence, hence MCF's emphasis on efficient allocation and use of public resources. The PLA's budget, although second only to the U.S. military in size, cannot meet these R&D spending demands alone, and it was such resource constraints that prompted the CCP to focus on leveraging the spending power of the broader economy, as well as state funding for civilian research institutions and universities, to develop dual-use technologies that benefit the PLA.¹⁷⁸

Dual-use research collaboration between the CAS and the PLA is ongoing and formalized, and has expanded since 2015 as a result of MCF. The CAS sits "at the center of this burgeoning web of civil-military academic linkages,"¹⁷⁹ a web that has been slowly forming for decades, but which has accelerated rapidly under Xi Jinping. The MCF Research Center at the PLA AMS boasts a close working relationship with the CAS.¹⁸⁰ In March 2018, the CAS and the AMS signed a strategic cooperation framework agreement in which the two committed to "jointly establish a high-end strategic think tank, jointly launch collaborative research projects, jointly promote the establishment of a coordinated innovation platform, and jointly cultivate talent and accelerate the exchange of personnel, and other aspects of deep cooperation."¹⁸¹ CAS President Bai Chunli said the agreement was a "concrete measure" taken in response to Xi's remarks at the first meeting of the MCFDC in June 2017.¹⁸²

In the speech that Bai referenced, Xi explained MCF's importance as such: "The elevation of military-civil fusion development to a national strategy is a significant outcome of our long-term search for a pattern of coordinated development to build the economy and national defense..., a response to complex security threats, and a major move to gain the strategic advantage for the nation.... [We must] accelerate the formation of an all-factor,

multidisciplinary, highly efficient structure for deep military-civil fusion development, step-by-step setting up a national strategic system and capabilities that fully integrate the military with the civil.”¹⁸³ Xi also identified biotechnology as ripe for MCF development:

Marine [science], outer space, cyberspace, biology, new energy, and other fields have strong military-civilian interoperability. It is necessary to implement the concept and requirements of military-civil fusion throughout the whole process of planning, design, organization and implementation, and the application of [research] results. We should work hard to solve outstanding problems and accelerate the formation of the military-civil fusion development pattern in emerging fields through multi-dimensional integration, coordinated promotion, and leapfrog development.¹⁸⁴

In March 2017, Xi Jinping spoke to the PLA’s delegation to the National People’s Congress (NPC),¹⁸⁵ and singled out the CAS as a special resource that must be utilized for the MCF strategy to succeed: “You must also bring into full effect the potential of the Chinese Academy of Sciences, high-ranked universities and colleges, and civilian and private enterprises in order to achieve the military use of civilian [resources] to the maximum degree.”¹⁸⁶ Later in the same speech, Xi specifically pointed to “local research and development academies and institutes,” a general category to which the WIV belongs, as a source of “R&D advantages” for the PLA to utilize.¹⁸⁷ Both in this speech and on other occasions in 2017, Xi invoked the historical role that CAS played in the PLA’s satellite and nuclear weapons programs to illustrate his point about the importance of CAS to MCF: “In those days, if we had not had that group of great scientists such as Qian Xuesen, Qian Sanqiang, and Deng Jiaxian, ‘Two Bombs, One Satellite’ would have never made it.”¹⁸⁸

In December 2017, the PLA Daily ran an article called “How to Transform the Research and Development Achievements of the Chinese Academy of Sciences into Military Products?,” reporting on a meeting held at the CAS Dalian Institute of Chemical Physics, apparently in response to Xi’s aforementioned remarks to the PLA in March. Over 200 leaders from the PLA (including the AMMS), the government, the CAS, state-run think tanks, and private industry attended.¹⁸⁹ The CAS had “made irreplaceably important

contributions” to national security, the PLA Daily wrote, citing the nuclear weapons program as the most famous example.¹⁹⁰

The PLA Daily report stressed: “[A]side from participating in major defense science and technology special projects [to develop] the famous technologies, inside the massive R&D system of the Chinese Academy of Sciences, there is an ocean of R&D achievements. Among these are many excellent technologies that not only have enormous value for civilian use, [but] the prospects for military use are absolutely vast as well.”¹⁹¹ The report discussed the formation of MCF leading groups within CAS institutes, which had already identified 53 existing projects as having military applications, including biotechnology, at two CAS institutes in the cities of Dalian and Qingdao.¹⁹² Luo Yongguang, the director of the MCF Development Center at the PLA National Defense University, spoke to the gathering and made it clear that PLA R&D priorities must take precedence over civilian goals: “[Civilian] R&D academies during the process of participating in military-civil fusion must insist on military requirements as the driving force.”¹⁹³

Five months later in May 2018, Xi Jinping spoke directly to a plenary meeting of CAS and CAE academicians about their role in the MCF strategy and the indigenous development of dual-use technology. Xi told the CAS and CAE to closely coordinate their efforts to innovate with those of the PLA: “We must exert ourselves to push forward with the fusion [approach] to the development of the economy and national defense, deepen the systematic reform of the national defense science and technology industry, enhance our capability to coordinate military-civil innovation, and improve the mechanisms to coordinate military-civil innovation.”¹⁹⁴ Xi further called on the CAS and the CAE to “accelerate the construction of the military-civil fusion development system...[in order] to eliminate obstacles to ‘the civilian participating in the military’ and the ‘military transferring to the civilian.’”¹⁹⁵

MCF, BIOTECHNOLOGY, AND WUHAN

As we have seen with the 863 Program and Made in China 2025 economic plan, biotechnology is also designated a priority research area for the MCF strategy. In 2017, the Central Military Commission’s Science and Technology Committee and the MOST issued a five-year “special plan for science and technology MCF development,” calling for systematizing a MCF approach to basic R&D for biotechnology and seven other target

fields. Biology was further designated as a field for which MCF special projects would be authorized.¹⁹⁶ In his 2018 address to the CAS, Xi Jinping highlighted how the life sciences and biotechnology, particularly synthetic biology, gene editing, neuroscience, and regenerative medicine, were “giving birth to a new transformation.”¹⁹⁷ During his March 2017 address to the PLA on “promoting technology to revitalize the military,” Xi spoke of biotechnology twice, and emphasized that the “intersection of artificial intelligence, network information, and biology” was the focus of a “fierce contest” between major powers vying for the lead in emerging technologies, a situation that required the CCP and PLA to “strengthen our sense of urgency.”¹⁹⁸

In August 2018, four PLA AMMS researchers wrote an article touting the potential of biopharmaceutical research for MCF development and noted that efforts to bring MCF to bear on this field had “received broad approvals at high levels” of the CCP.¹⁹⁹ They described biopharmaceuticals as well-suited for MCF:

The military-civil, dual-use nature of biopharmaceutical science and technology is strong. It has natural properties for military-civil fusion, and is easy to fuse, therefore we should strengthen the alliance between local governments and the military in a mutual exchange of assistance, with coordinated overall planning...bringing into effect the powerful advantages of each side in order to achieve full-chain fusion from research and development planning, project applications, cooperative development, application of results, and resource sharing.²⁰⁰

The construction of national laboratories, like the Wuhan BSL-4 lab, would be instrumental in this regard: “Make military-civil fusion in the field of biopharmaceutical science and technology an important foundation and a mission goal to guide the construction of national laboratories [in order to] accelerate the transformation of combat capabilities....”²⁰¹

In 2015, the General Office of the CCP Central Committee and the General Office of the State Council selected Wuhan as one of only three provincial capitals nationwide that would host pilot reform experiments to promote technological innovation and “accelerate the development of in-depth military-civil fusion.”²⁰² In their 2020 work report, the Wuhan authorities continued to stress the importance of MCF. The city set a goal to establish a “New Model Zone for National Military-Civil Fusion Innovation,”

and urged local officials to “accelerate the deep development of military-civil fusion and support the two-way transfer and transformation of military-civil, dual-use technologies.”²⁰³

Comments made by a CCP official at the WIV in September 2018 illustrated how the WIV is situated at the intersection of the development of the biotech industry in China and the advancement of the PLA’s biodefense capabilities: “Compared to other industries, the development of the biopharmaceutical industry [in China] is even weaker. The institute’s building of the Center for Biosafety Mega-Science must be oriented towards the main battlefields of the national economy, aligned with the needs of the state, [and] bring into full effect the important functions of solving human epidemic diseases and protecting the biosecurity of the state.”²⁰⁴

THE WIV AND THE PLA AMMS

The WIV is a state-run and largely state-funded research facility. This status subjects the WIV to mobilization in support of dual-use and classified military research projects, and while this arrangement has existed for decades, it has received a renewed mandate under the rubric of MCF discussed above. It is important to remember that the WIV’s BSL-4 laboratory complex was China’s first biocontainment lab built to study the world’s most dangerous pathogens,²⁰⁵ and is part of a new system of national laboratories, many of which are CAS facilities, under development for the express purpose of combining work in both civilian and defense-related fields as well as encouraging multidisciplinary research.²⁰⁶ The WIV reportedly houses a Military Management Division, though since the outbreak of the pandemic, references to this division have been removed from the WIV website.²⁰⁷

The WIV maintains a collaborative relationship with the PLA AMMS that is routine and robust, which can be seen from its professional research publications. For example, a curiously timed paper titled “Molecular Mechanism for Antibody-Dependent Enhancement of Coronavirus Entry,” which its authors submitted for publication in November 2019, featured WIV coronavirus expert Shi Zhengli and her team member Chen Jing partnering with PLA AMMS scientists Zhou Yusen, Sun Shihui, He Lei, and Chen Yuehong.²⁰⁸ Earlier in 2019, a WIV research group led by Peng Ke partnered with a PLA AMMS research group led by Liu Wei to study the role of calcium channel blockers

in reducing fever in patients suffering from thrombocytopenia syndrome virus.²⁰⁹ A total of 10 PLA researchers participated, eight of whom worked for AMMS.²¹⁰

In 2017, Shi Zhengli and 10 other WIV researchers joined forces with 13 PLA AMMS researchers to conduct a study funded in part by the U.S. National Institutes of Health (NIH) and the U.S. Agency for International Development (USAID) that found a bat coronavirus to be the cause of a fatal diarrhea syndrome among swine.²¹¹ In 2015, WIV researcher Wang Hanzhong won an award from the PLA General Logistics Department for his “close cooperation” with the PLA AMMS and the PLA No. 302 Hospital on a study of emerging pathogens that infect the respiratory channel and intestinal track.²¹² These examples of WIV-AMMS collaboration were drawn from the public domain and are by no means exhaustive. The WIV has further engaged in classified research, including laboratory animal experiments, on behalf of the PLA since at least 2017.²¹³

Personnel employed by the PLA AMMS appear to maintain a working presence at the WIV, and in some cases, serve in institutional roles. An example of the latter is Colonel Cao Wuchun, the Executive Director of PLA AMMS Institute of Microbiology and Epidemiology, who sits on the scientific advisory committee for the WIV Center for Emerging Infectious Diseases led by coronavirus expert Shi Zhengli.²¹⁴ Two other PLA scientists also served on that advisory committee: AMMS microbiologist Tong Yigang, who has an appointment at Beijing University of Chemical Technology, and Tu Changchun of the AMMS Institute of Military Veterinary Medicine.²¹⁵ AMMS virologist Zhou Yusen, Shi’s collaborator in the aforementioned 2019 project, worked with the WIV, and likely at the WIV episodically for several years.²¹⁶ A WIV report from 2016 identified Zhou and one of his doctoral advisees as key partners in a study that sought to develop a vaccine for MERS-CoV.²¹⁷ It is conceivable that Zhou could have been working at the WIV in 2019 when the research was being conducted for the paper that he coauthored with Shi Zhengli and Chen Jing on antibody-dependent enhancement of coronavirus entry.

Some WIV researchers were trained by the PLA AMMS. Qiu Yang spent almost five years at the PLA AMMS Institute of Microbiology and Epidemiology doing post-doctoral research just prior to joining the WIV in 2018. He works on coronaviruses, among other pathogens.²¹⁸ Another example of the PLA AMMS operating at the WIV appeared in connection to China’s response to the outbreak. On January 30, 2020, the PLA

acknowledged that it had dispatched a team of AMMS experts led by epidemiologist and virologist Major General Chen Wei to guide the emergency response in Wuhan.²¹⁹ Chen reportedly took control of directing the operations of the WIV for some period of time following her arrival in Wuhan.²²⁰ The fact that Beijing tapped Major General Chen, not George Gao or another of its accomplished civilian scientists, to seize the reins at the WIV further implies that the PLA already had an established role there.²²¹

Some reports suggest the PLA AMMS was planning to utilize the WIV's BSL-4 laboratory years before the construction was completed. In 2008, two officers from the Department of Science and Technology at the PLA AMMS published an article that described the importance of collaboration with civilian research centers. Among other things, they advocated for a unified biological defense system that would pool the resources of the PLA and local governments and be managed from the central level down to provincial and local governments all around China. In the same vein, they called for the "building of a well-developed working network of state-military coordination in branch laboratories of various [BSL] levels nationwide."²²² In keeping with the "principle of military-civil integration," the authors stressed the importance of "constructing the necessary high-level biosafety (BSL-3 and BSL-4) laboratories, and strengthening the construction of these laboratories' facilities and technological equipment to raise the capability of the laboratories to monitor and test important pathogenic microorganisms."²²³ When this article was written, China had no BSL-4 laboratory, but what would become the first, the Wuhan National Biosafety Laboratory, had been under construction for four years.²²⁴ It thus stands to reason that these AMMS authors had the WIV in mind when drafting the statements quoted above.

THE WIV AND THE WUHAN INSTITUTE OF BIOLOGICAL PRODUCTS

Another reflection of the research nexus between the WIV and the PLA AMMS, particularly in vaccine development, can be seen in the longstanding, symbiotic relationship between the WIV and the neighboring Wuhan Institute of Biological Products (WIBP). The WIBP is a large vaccine research and production facility that was founded by the Central Military Commission in 1950.²²⁵ It is currently owned and operated by a subsidiary of the state-owned megacorporation Sinopharm.²²⁶ The WIBP played an important role in researching vaccines for SARS-CoV-1, and its BSL-3 laboratory, one of the country's first, was working on SARS as early as 2003.²²⁷

The WIV and the WIBP have been co-located for decades, initially at the original WIV campus in Wuchang District. Beginning in 2009, the WIBP relocated its entire operations to the WIV's new campus at the Zhengdian Gold Industrial Park in Jiangxia District, a move that was completed in 2016, likely in conjunction with the opening of the BSL-4 lab.²²⁸ The WIV and the WIBP are connected by more than proximity. As early as 2008, the WIV organized a "Wuhan Emerging Infectious Diseases Research Coalition" that included experts from the WIBP and local universities and hospitals.²²⁹ In 2014, the director of the WIV and the president of the WIBP pledged to increase "strategic cooperation" between the two entities, particularly in the areas of research, development, and production of biotechnology and personnel training and exchange.²³⁰

Beyond the fact that it was founded by the Central Military Commission, ongoing ties between the WIBP and the PLA have been reported throughout its history. In 1993, the PRC government declared to the BWC that the WIBP was one of seven vaccine production facilities that were part of a "national defensive biological warfare R&D program."²³¹ In 2001, Taiwanese intelligence told an American expert on biological and chemical warfare that the WIBP was not merely a vaccine producer, but was also involved in the "cultivation of various bio-warfare agents."²³² In a 2015 study, a retired Israeli intelligence officer also drew a link between the WIBP and the PLA, and underscored the PLA's practice of using ostensibly civilian entities to allow it to interface more easily with international suppliers of technology and top scientific institutions in the West.²³³ This study further noted that most vaccines produced by the WIBP and other state-owned facilities under the Sinopharm umbrella are not produced by privately owned vaccine manufacturers in China, and that these vaccines happen to correspond in large part to the "essential pathogens within any bio-warfare program."²³⁴

Before we consider the WIV's problems with biosafety, it is worth noting that the WIBP has had a checkered past when it comes to quality control. In November 2017, the State Food and Drug Administration reported that sampling inspections had found that over 400,000 DPT (diphtheria, pertussis, and tetanus) vaccines produced by the WIBP were substandard and unlikely to confer immunity.²³⁵ The WIBP had sold 210,000 of these shoddy vaccines for children to the Hebei Provincial Center for Disease Control and Prevention (CDCP) and another 190,500 to the Chongqing Municipal CDCP.²³⁶ Production of DPT vaccines at the WIBP was consequently shut down until July 2018.²³⁷

PRESSURE TO PLEASE THE PARTY: XI JINPING PUTS THE CAS IN THE **POLITICAL PRESSURE COOKER**

In the years preceding the pandemic, political pressure had been building on the CAS. Several factors contributed to this environment at the CAS, but the first and most important factor was the “enormous pressure from the political leadership” to produce “visible achievements.”²³⁸ Such achievements refer to major scientific breakthroughs that lead to the indigenous innovation of new technologies, thereby addressing what the CCP calls the “stranglehold problem.” With relatively few exceptions, Chinese enterprises remain dependent on foreign sources of core technologies.²³⁹

CCP leaders refer to this foreign dependency as the “stranglehold problem,” which is a recurring theme of concern at the CAS, including the WIV specifically, as well as other state-run research institutions charged with meeting the science and technology goals set by Beijing. It refers to the “direct [deleterious] effects created by cutting off the supply of foreign key and core technologies” to China,²⁴⁰ which means technologies that China “must import because it is unable to produce them domestically in sufficient quality or quantity.”²⁴¹ In December 2020, as a primary goal of China’s economic plan for 2021 to 2025, Xi Jinping renewed his call for officials to “target industrial weak links, implement projects to tackle major problems with key and core technologies, and solve a series of ‘stranglehold’ problems as soon as possible.”²⁴²

More is at stake than simply reducing perceived vulnerabilities related to the supply of foreign technologies. As one group of Chinese scholars observed in a 2018 article, the CCP leadership speaks of an “urgency for China to transform its economic development model from one that is labor, investment, energy, and resource-intensive into one that is increasingly dependent on technology and innovation.”²⁴³ The CAS is critical to that economic transformation, and as China reaps fewer and fewer dividends from the resource and labor-intensive model that drove its growth from the 1980s until the early 2000s, the more the urgency builds on the science and technology research system as a whole, and the CAS in particular, to show that the reforms and investments of the past decade are bearing economic fruit.²⁴⁴ The CAS itself also feels the weight of questioning about whether it deserves the resources it consumes. Reports indicate that skepticism exists within Chinese officialdom about the wisdom of maintaining such a massive

research organization, which is far larger than anything comparable elsewhere in the world, and survives largely on the public dole.²⁴⁵

Another factor creating pressure on the CAS is the sustained attention of Xi himself. While efforts aimed at spurring innovation were underway at the CAS as early as 1998,²⁴⁶ Xi has placed great emphasis on the imperative for the CAS to lead the charge on indigenous innovation. Xi visited the CAS in July 2013, a few months after becoming paramount leader, and stressed that the academy should strive to become China's main source of innovative ideas and technological breakthroughs.²⁴⁷ He specifically urged the CAS to become a "pioneer" in four areas (the "four firsts"):²⁴⁸ "being the first to achieve leapfrog development in science and technology, being the first to build a national platform for innovative talent, being the first to build a high-level science and technology think tank in the nation, and being the first to build a world-class institution for research and development."²⁴⁹

WIV officials spoke in 2019 with some frequency about their need to show results in keeping with Xi's "four firsts" edict, and the lack of progress toward meeting the "four firsts" would emerge as a theme of a CCP investigation of the CAS in September 2019. Xi has also taken a hands-on approach to the reform of the CAS generally, to the reform of the elite academician system at CAS specifically, and to the reform of central government financing mechanisms for science and technology research, which impacts the CAS directly.²⁵⁰

While all CAS research institutes have been subjected to political pressure to produce scientific breakthroughs, it is important to note that this pressure was amplified in the case of the WIV. One reason the WIV faced particularly high expectations was its status as the home to China's first, and until 2018, only BSL-4 laboratory.²⁵¹ CCP leaders and state-run media repeatedly touted the existence of the Wuhan National Biosafety Laboratory as a milestone for China and suggested that its establishment would lead to major advances in science and public health. In addition, the CAS chose the WIV in 2014 to host the Center for Biosafety Mega-Science, one of only three large, multidisciplinary "mega-science" research centers nationwide, which were established in response to Xi Jinping's proposal that the CAS create strategically important facilities to promote collaboration across various specialties to facilitate innovation.²⁵² As we will document later in this report, WIV management repeatedly appealed to the national

importance of the BSL-4 laboratory and “mega-science” center when urging WIV research personnel to work diligently toward meeting the goals of the party-state.

PRE-PANDEMIC, SCIENTISTS ACKNOWLEDGE HISTORY OF LAB LEAKS, WARN OF RISKS

Expressions of concern about biosafety risks at the state-run WIV did not begin with speculation about the origin of SARS-CoV-2 in 2020. As early as 2015, some scientists had called into question whether the potential benefits to be gained from the WIV’s research involving the artificial manipulation and creation of chimeric coronaviruses was worth the considerable risks to public health inherent to this line of research.²⁵³ In 2017, other scientists warned of the potential dual-use applications, and worried about “pathogens escaping” in light of China’s history of laboratory leaks, particularly several incidents involving SARS-CoV-1.²⁵⁴ SARS-CoV-1 escaped from the Chinese National Institute of Virology in Beijing, an affiliate of the CCDCP, a total of four times in 2004, infecting at least two researchers, and causing a few cases of limited community spread that resulted in one death.²⁵⁵ Laboratory acquired infections of SARS-CoV-1 also occurred among researchers in Singapore and Taiwan in 2003.²⁵⁶ In November 2021, a research assistant in Taiwan became infected with SARS-CoV-2 during the course of her work in a laboratory, most likely by inhaling the virus or because she removed personal protective equipment (PPE) incorrectly.²⁵⁷

China may be responsible for the only known case of a laboratory leak giving rise to a pandemic. In 1977, H1N1 human influenza “re-emerged” in China, and later in Russia, and rapidly produced a pandemic, though deaths were few.²⁵⁸ Earlier genetic tools found that this “time-traveling throwback” was closely related to H1N1 human influenza viruses circulating in 1949-1950, but not to those that circulated before or after then.²⁵⁹ As one expert noted in a history of laboratory leaks, “it has become clear that [H1N1’s] appearance in 1977 was almost certainly due to escape from a virology lab of a virus sample that had been frozen since c1950.”²⁶⁰ Virologists then, as many remain now, were loath to confront the matter head-on: “Western virologists quietly let the matter of a laboratory escape origin for the 1977 H1N1 virus drop from discussion, out of an abundance of scientific caution, and also out of an eagerness not to offend the Russian and Chinese scientists, whose early gestures of cooperation in worldwide influenza surveillance were very important to foster....”²⁶¹ Only since 2008 have virologists started

to admit in their professional writings that the 1977 H1N1 pandemic likely resulted from a laboratory release.²⁶²

The history of laboratory leaks, both in China and elsewhere, certainly factored into concerns about gain-of-function research that grew more prominent in the years preceding the pandemic. A group of distinguished scientists called the Cambridge Working Group issued a statement in July 2014, which while not directed specifically at the WIV, urged a halt to the kind of gain-of-function research²⁶³ conducted at the WIV: “Experiments involving the creation of potential pandemic pathogens should be curtailed until there has been a quantitative, objective and credible assessment of the risks, potential benefits, and opportunities for risk mitigation, as well as comparison against safer experimental approaches.”²⁶⁴ As a result of these concerns, starting in October 2014, the U.S. government imposed a pause on federal funding for any new studies that included certain gain-of-function experiments involving influenza, SARS, and MERS viruses, and encouraged those currently conducting this type of research, regardless of the source of their funding, to voluntarily suspend their work while the risks and benefits were reassessed.²⁶⁵ The moratorium was lifted in December 2017.²⁶⁶

At times, the WIV’s work was squarely at the center of international concerns about gain-of-function research with viruses. In 2015, a team from the University of North Carolina Chapel Hill, the WIV, and other research institutions constructed a novel virus by replacing the spike protein in the backbone of SARS-CoV-1 with one extracted from a bat virus known as SHC014-CoV. They tested the chimera to see if it could infect cells in the human airway and found “robust viral replication both in vitro and in vivo.”²⁶⁷ Simon Wain-Hobson, a virologist at the Pasteur Institute in Paris, noted at the time that the researchers’ creation “grows remarkably well” in human cells, adding that “if the virus escaped, nobody could predict the trajectory.”²⁶⁸ Richard Ebright, a molecular biologist at Rutgers University, likewise assessed, “The only impact of this work is the creation, in a lab, of a new, non-natural risk.”²⁶⁹

EARLY WIV REPORTS SUGGEST LAXITY

Early reports at the WIV itself also revealed potential breaches in lab safety standards. In January 2011, an inspection of WIV laboratories working with pathogens “discovered that some research groups and support departments did not meet the standards in certain areas and had hidden safety dangers with the storage of bacterial and viral

samples and aspects of their experimental activities.”²⁷⁰ As this report will document later, the unsafe storage of bacterial and viral samples emerged as a theme of concern in 2019 and 2020, which was raised by the CCP leadership at the WIV as well as in a central directive issued to all BSL-3 and BSL-4 labs after the pandemic began.

Concerns about biosafety at the WIV continued to be raised periodically between the 2011 example cited above and the primary period of examination in this report (2018 to 2020). For example, a report about biosafety inspections at the WIV conducted in 2018 “raised safety and security management requirements to target problems that were found during comprehensive safety and security inspections,”²⁷¹ and “used recent cases of specific safety procedural [breaches] during research and development and production drawn from around the country as a warning, [and] required [the WIV] to take steps to firmly establish a security mindset as a line of defense.”²⁷²

WERE THE WIV’S BIOSAFETY LAPSES THE INEVITABLE FALLOUT FROM EXPELLING THE FRENCH?

One of the early signs that things could be going awry at the WIV was Beijing’s backtracking on the commitments it had made to Paris. During an October 2004 visit to Beijing, French President Jacques Chirac agreed that France would provide the BSL-4 laboratory’s blueprints and designs and transfer several mobile BSL-3 laboratories to China. In exchange, Beijing agreed to use a French construction firm, allows French technicians to oversee the lab construction project and the launch of operations, and to welcome 50 French scientists to work at the WIV and supervise the training of their Chinese counterparts. It was understood that much of the research conducted at these new sites would be collaborative and that all of it would be shared between researchers in the two countries.²⁷³

Chirac’s willingness to construct a BSL-4 laboratory in Wuhan reportedly elicited serious concern among defense and intelligence officials in Paris as well as their counterparts in Washington, as such laboratories and the technologies inside them are inherently dual-use. Four of the mobile BSL-3 laboratories that France transferred to China in 2004 went missing, and the PLA was believed to have taken possession of them. French and American experts feared that the BSL-4 laboratory would face the same fate.²⁷⁴ Excessive WIV procurement requests for positive pressure protective suits, which are used in BSL-

4 facilities, also raised questions about why so many suits were needed unless some portion of them were being diverted for PLA use.²⁷⁵

Tensions between Paris and Beijing soon developed as the PRC started to break the promises it had made. It used a PRC state-owned construction firm with ties to the PLA rather than Technip, the French engineering company that Beijing had agreed to use, to build the BSL-4 laboratory in Wuhan. Once sidelined and denied the oversight role it had been originally assigned, Technip pulled out of the project entirely, refused to certify the building, declaring that it could not accept any legal responsibility for the work done by the PRC firm, which may have used substandard materials and equipment.²⁷⁶ Alain Merieux, the French co-lead of the project, resigned in 2015, telling a French radio broadcaster: “I am giving up the co-presidency of the BSL-4 because it is a Chinese tool. It belongs to them even though it was developed with the technical assistance of France.”²⁷⁷

None of the 50 French researchers were ever allowed to work at the WIV. It is worth recalling that their presence was intended in part to ensure that proposed biosafety trainings were carried out and general biosafety practices adhered to international standards. Only one French scientist, Rene Courcol, a microbiologist from Lille University Hospital, was granted access in 2018 to perform a quality control and biosafety assessment. He has declined to speak to the press, and a single WIV report that mentioned his assessment provided no details as to its content.²⁷⁸ As Joseph Harriss, a Paris-based correspondent for the American Spectator, aptly put it, “Thanks to French naïveté – they actually believed Chinese promises – China got its new dual-use laboratory and the ability to do whatever it likes with it, and France got zilch.”²⁷⁹

THE CHRONOLOGY: WHAT IT IS AND WHAT IT ISN'T

With the general scene now set, let us proceed to the chronology itself. What follows is a forensic exercise chronicling events, official actions, legislative and regulatory initiatives, policy pronouncements, and speeches and remarks by relevant authorities in the PRC that pertain to biosecurity, biosafety, and public health – both as general matters and specifically in response to the outbreak of SARS-CoV-2. This exercise has been neither exhaustive nor comprehensive in scope – such a goal is unachievable in light of the PRC authorities' advanced abilities to control access to information – but we believe a sufficiently robust sample of data has been collected from the public domain to capture with a somewhat surprising degree of clarity the salient trends and events in China at the time. We have endeavored to be as complete and inclusive as possible, but almost certainly missed things of value unintentionally. This was inevitable, both as a result of the limits of time and personnel and due to the obscure nature of the subject at hand. We welcome readers to supplement this work with their own; the body of evidence we have assembled is significant, but gaps in the record remain.

Not every entry that follows should be seen as somehow directly related to the outbreak of SARS-CoV-2, because no such implication was intended by its inclusion in the chronology. Some entries beginning in 2019 are clearly related to the outbreak. Others could very well be related, but it is hard to draw a clear conclusion based on the information currently available. Some entries are most likely unrelated, or only tangentially related, but they nevertheless captured the prevailing pressures of the day and preexisting concerns about biosafety and biosecurity that may have influenced the authorities' response. To be clear, many entries appear simply for the purpose of providing broader context to the reader. The result is a report that is far from concise, and some might even call cumbersome, but there is no glide path to clarity on the origin of this virus. We could only plod patiently through the confusing morass that surrounded the initial outbreak in China in the hope that clues would be gathered along the way.

THE CHRONOLOGY: 2018

JANUARY 2018: XI JINPING TELLS CADRES TO BE ALERT FOR A "SARS-LIKE VIRUS"

On January 5, Xi Jinping gave an "important speech" at the opening of a study session on the spirit of the CCP 18th Party Congress, which is when Xi became the CCP's top leader in November 2012. All seven members of the Politburo Standing Committee, the CCP's top decision-making body, were in attendance.²⁸⁰ In April 2021, the People's Daily, the official mouthpiece of the CCP, published a piece with excerpts from various Xi speeches over the years that focused on "guarding against and neutralizing major risks." The People's Daily described Xi's speech from January 5 as having "raised eight aspects and 16 dangers, among them...[major infectious viruses like] SARS,...[which we] must also be on the alert for at all times [and] take strict precautions against.'" ²⁸¹ It appears that the text of this speech has never been published in full, and the official summary published by Xinhua on the day that the speech was delivered in 2018 did not include the quote about SARS above.²⁸²

JANUARY 2018: U.S. DIPLOMATS VISIT WIV AND REPORT SAFETY ISSUES TO WASHINGTON

After visiting the WIV and speaking with its researchers, U.S. diplomats conveyed concerns about the training of personnel and biosafety conditions at the newly constructed BSL-4 laboratory complex located on the WIV's Zhengdian Research Industrial Park campus in Jiangxia District²⁸³ in an internal cable transmitted to Foggy Bottom on January 19, according to the Washington Post.²⁸⁴ "During interactions with scientists at the WIV laboratory, they noted the new lab has a serious shortage of appropriately trained technicians and investigators needed to safely operate this high-containment laboratory," the January 19 cable stated, relaying comments from WIV researchers. The cable further cautioned that the WIV's work with bat coronaviruses potentially posed a risk of new SARS-like pandemic.²⁸⁵

MARCH 2018: MOST TOUTS DISEASE SURVEILLANCE SYSTEM AS A LESSON LEARNED FROM SARS

On March 10, Wan Gang, the PRC Minister of Science and Technology, spoke to a press conference on the subject of "accelerating the building of an innovative country." Wan discussed the SARS-CoV-1 epidemic of 2003-2004 as the impetus for the creation of a

nationwide system of proactive disease surveillance: “We gradually transitioned from passive defense to active defense in responding to the sudden outbreak of infectious disease. It has already been more than a decade since SARS, but we still have a profound memory [of it], from then we started major projects on infectious disease, and established a network of Chinese Center for Disease Control and Prevention laboratories as a special response system for sudden outbreak of infectious disease.”²⁸⁶

MARCH 2018: CAS HOLDS MEETING ON XI’S ORDER TO “DEEPEN MILITARY-CIVIL FUSION”

On March 16, the CAS in Beijing held a work meeting to mark the launch of an academy-wide program to “deepen the advancement of military-civil fusion development research” – a program that was designed in response to a direct order from Xi Jinping.²⁸⁷ The wide range of organizations represented from the party, military, and government reflected the meeting’s political importance. More than 60 participants in total attended, and they represented one office of the CCP Central Committee, three offices of the Central Military Commission, one office of the PLA AMS, four offices at CAS headquarters in Beijing, and around 30 CAS research institutes (such as the WIV).²⁸⁸

The purpose of this meeting was to start a program to better incorporate the PLA’s research goals into the work of the CAS in response to directives that Xi had issued in two speeches just days before on March 2 and March 12, leading to the “formation of a long-lasting mechanism for research on the military-civil fusion development strategy” at the CAS.²⁸⁹ Xiang Libin, the vice president of the CAS, made this point plain:

Xiang Libin’s wrap up speech emphasized that the launch of the Chinese Academy of Sciences’ Program on Deepening the Advancement of Military-Civil Fusion Development Research is the Chinese Academy of Sciences’ implementation of General Secretary Xi Jinping’s strategic instructions and requirements regarding military-civil fusion development, especially the important remarks of General Secretary Xi Jinping on March 2 of this year at the first plenary meeting of the 19th Party Congress Central Committee’s Commission on Military-Civil Fusion Development and the concrete measures contained in the important remarks delivered by General Secretary Xi Jinping on March 12 during the joint meeting with delegates from the People’s Liberation Army and People’s Armed Police to the plenary session of the 13th National People’s Congress.²⁹⁰

Xinhua's report of Xi's speech on March 2 omitted his comments about CAS.²⁹¹

Readers may recall from the background section that Xi also spoke to the PLA delegation to the NPC the year prior in March 2017,²⁹² when he singled out the CAS as a special resource to be utilized for the MCF strategy: "You must also bring into full effect the potential of the Chinese Academy of Sciences, high-ranked universities and colleges, and civilian and private enterprises in order to achieve the military use of civilian [resources] to the maximum degree."²⁹³ Given how quickly the CAS convened the aforementioned meeting following Xi's speeches on March 2 and March 12, 2018, we might infer that Xi expressed dissatisfaction, or at a minimum, called for faster progress with integrating the PLA into CAS, including by outlining "concrete measures" to this end, as Xiang Libin indicated above.

On March 22, just a week after this meeting to deepen MCF was held at the CAS, the CAS and the PLA AMS signed a strategic cooperation framework agreement in which the two committed to "jointly establish a high-end strategic think tank, jointly launch collaborative research projects, jointly promote the establishment of a coordinated innovation platform, and jointly cultivate talent and accelerate the exchange of personnel, and other aspects of deep cooperation."²⁹⁴ CAS President Bai Chunli said the agreement was a "concrete measure" taken in response to Xi's remarks.²⁹⁵ We can confidently conclude that as a result of these initiatives, the WIV and other CAS research institutes likely experienced a growing presence of the PLA and prioritization of its research agenda starting in spring of 2018 and continuing into 2019.

MARCH 2018: STATE COUNCIL REVISES BIOSAFETY REGULATIONS FOR LABS STUDYING PATHOGENS

On March 19, the State Council revised the "Biosafety Management Regulations for Laboratories that Study Pathogenic Microorganisms." First passed in 2004, the regulations were updated once in February 2016 before the second revision occurred in March 2018.²⁹⁶ The 2018 updates focused on strengthening and clarifying regulations of BSL-3 and BSL-4 laboratories, perhaps in anticipation of the opening of the nation's first BSL-4 lab at the WIV. These revisions also suggested that some laboratories had engaged in research with highly pathogenic microorganisms without state authorization, and that the state was concerned about the spread of infectious disease as a result. In

fact, punitive measures, including criminal penalties, were added to the regulations to address safety incidents that lead to an outbreak of infectious disease.

Here are some of the relevant changes:

1. Article 22 was revised from “laboratories that have obtained the qualification certificate for experimental activities with highly pathogenic microorganisms” to “Level 3 and Level 4 laboratories.”²⁹⁷
2. A new reporting requirement was inserted into Article 26: “The supervisory health department and veterinary department of the State Council shall regularly summarize and inform each other about the number of laboratories, the establishment and distribution of laboratories, and the status of laboratory activities involving highly pathogenic microorganisms in Level Three and Four laboratories.”²⁹⁸
3. Article 56 was amended to read:

If a Level 3 or Level 4 laboratory has not been authorized to conduct experimental activities with certain types of highly pathogenic microorganisms, or microorganisms that are suspected of being highly pathogenic, the supervisory health department or veterinary department of the local people’s government at the county level or above shall, in accordance with their respective duties, order the cessation of relevant activities, supervise the destruction of pathogenic microorganisms used in experimental activities, or send them to the storage facility, and issue a warning [to the laboratory]. For those incidents that cause the transmission and spread of an infectious disease or other serious consequences, the main person responsible, the supervisory personnel who are directly responsible, and other directly responsible personnel shall be punished by dismissal from their position or termination in accordance with the law. For those incidents that constitute a crime, criminal culpability shall be investigated according to the law.²⁹⁹

4. Article 61 was revised from “the original certificate-issuing department shall revoke the laboratory’s qualification certificate for engaging in experimental activities with highly pathogenic microorganisms” to “[the department] shall order the cessation of the [prohibited] experimental activity, and the laboratory

shall not apply to engage in experimental activities with highly pathogenic microorganisms for two years.”³⁰⁰

A 2018 study of biosafety conditions at laboratories in the municipality of Zhangjiajie in Hunan Province, approximately 330 miles southwest of Wuhan, may provide some insight into the types of problems prevalent at laboratories in China that led to the regulatory revisions above. The purpose of the study, which was conducted by a team of researchers at the Zhangjiajie Municipal CDCP and Municipal Health Commission, was to “understand the biosafety conditions at laboratories studying pathogenic microorganisms in Zhangjiajie, to analyze prominent problems currently faced by laboratories studying pathogenic microorganisms in Zhangjiajie, and to identify countermeasures to eliminate hidden dangers with biosafety in laboratories.”³⁰¹ After inspecting 37 laboratories in the municipality, the researchers concluded the following: “Our findings allow for no optimism about biosafety conditions at laboratories in Zhangjiajie. There are many hidden safety dangers, including occupational exposure, hospital acquired infections, environmental hazards, lack of training, those without credentials taking posts, management systems that do not operate effectively, leadership that does not place enough importance [on lab safety], deficient supervision and management by relevant health departments, etc.”³⁰²

MARCH 2018: WIV PROPOSES TO CREATE VIRUS WITH UNUSUAL SITE FOUND IN SARS-COV-2

On March 24, the New York-based EcoHealth Alliance, in partnership with the WIV, virologist Wang Linfa (a native of China who is based in Singapore), and Professor Ralph Baric at the University of North Carolina Chapel Hill, submitted a proposal for a project called DEFUSE to be considered for funding from the Committee for Preventing Emerging Pathogenic Threats at the Defense Advanced Research Projects Agency (DARPA).³⁰³ They requested \$14.2 million for a study that would take the most interesting spike proteins that the WIV collected from unpublished SARS-related coronaviruses circulating in bat colonies in Yunnan province, and create full-length infectious clones that they would test in human airway cultures and transgenic mice expressing the human ACE2 receptor.³⁰⁴ Most significantly, the team proposed to artificially insert protease cleavage sites, specifically furin cleavage sites (FCS), into the unpublished bat coronaviruses to test whether such insertions would affect the ability of the viruses to jump to humans.³⁰⁵

SARS-CoV-2, the virus that causes COVID-19, has an FCS, which is a four-amino acid insert at the junction of the receptor-binding (S1) and fusion (S2) domains of the spike protein. It is the first known SARS-related coronavirus (sarbecovirus lineage) to possess such a site.³⁰⁶ The FCS plays a critical role in the replication, transmissibility, and pathogenesis of SARS-CoV-2.³⁰⁷ It is not yet clear to scientists how this particular site appeared in a sub-genre of coronaviruses in which such sites have never been observed. In the words of Cornell University Virologist Gary Whittaker, “So far, a viable natural origin for the SARS-CoV-2 S1–S2 site through recombination or mutation of a bat-origin virus has proved to be elusive.”³⁰⁸

While we cannot conclude with confidence on the basis of currently available information that the insertion of the FCS into SARS-CoV-2 was the deliberate result of an experiment at the WIV, the proposed work described above sets the insertion of FCS sequences into SARS-like viruses as a specific goal.³⁰⁹ Moreover, we also know that Shi Zhengli’s research team at the WIV would have been familiar with past experiments involving the successful insertion of an FCS sequence into SARS-CoV-1 and other coronaviruses, and they had ample experience of their own with the construction of chimeric SARS-like viruses. In addition, the WIV team would have been aware of published work done by researchers at the University of North Carolina Chapel Hill – frequent collaborators with the WIV – involving the FCS sequence and the FCS-dependent activation mechanism of human ENaC, which experts have noted is “perfectly identical” to the FCS sequence found in SARS-CoV-2.³¹⁰

For the purpose of this study, it is important to note how the DEFUSE proposal described the intended role of the WIV. It indicated that Shi Zhengli’s team would “conduct viral testing on all collected samples, binding assays, and some humanized mouse work.”³¹¹ While DARPA declined to fund this project in part due to concerns about the risks of such gain-of-function research,³¹² Shi and her team could have completed the work with funding they received from PRC authorities around the same time period for what appear to have been similar proposals (see section below: “January 2019: WIV Team Wins State Funding to Study Bat SARS-Related Coronaviruses”).

The serial passaging in humanized mice, in particular, could have presented a risk for accidental infection if the work were done under BSL-2 conditions, if proper protocols were not followed carefully under BSL-3 conditions, or if an equipment failure occurred,

such as an unperceivable containment breach in the biosafety cabinet that housed the humanized mice. A patent that the WIV filed in November 2020 suggests that the WIV may have experienced just such a breach.³¹³ It is conceivable that a researcher could inhale infectious aerosol particles produced by humanized mice, which in the case of SARS-CoV-2, would likely be present in the air even before symptoms of illness were evident in the mice, as demonstrated by a recent experiment involving SARS-CoV-2 and Syrian hamsters.³¹⁴ Professor Baric further explained in a 2021 interview: “Historically, the Chinese have done a lot of their bat coronavirus research under BSL-2 conditions. Obviously, the safety standards of BSL-2 are different than BSL-3, and lab-acquired infections occur much more frequently at BSL-2. There is also much less oversight at BSL-2.”³¹⁵

APRIL 2018: NATIONAL SECURITY EDUCATION DAY MARKED BY “APPROACH BIOSAFETY” ACTIVITIES

On April 15, PRC authorities held the third annual National Security Education Day,³¹⁶ and for the second year in a row,³¹⁷ the CCDCP held various activities to increase public awareness of the importance of biosafety and biosecurity. One aspect of the campaign in some localities was “preventing leaks of national secrets.”³¹⁸ It appears that the CCDCP also took advantage of the occasion to gain greater visibility into biosafety conditions in the laboratories run by the PLA. Xinhua noted that the CCDCP “through lectures, exhibitions, tours of biosafety laboratories, and other various forms entered military bases and campuses.”³¹⁹

MAY 2018: XI JINPING GIVES SPEECH TO CAS

On May 28, Xi Jinping delivered a speech to a plenary assembly of academicians at the CAS and the CAE. It contained four themes of note for the purposes of this study. The first point Xi made was to stress that the CCP alone is in charge of the scientific enterprise in China: “We uphold the party’s leadership of the science and technology enterprise, strengthen the party’s system of leadership of science and technology work, and bring into full effect the political advantages of the party’s leadership.”³²⁰

The second point was Xi’s overwhelming emphasis on the imperative for the CAS and CAE to produce cutting-edge technologies indigenously to address the so-called “stranglehold” problem:

Concentrate your efforts in the critical fields and the places where we face a stranglehold, assemble the power of your elite [scholars] to make strategic arrangements that will achieve breakthroughs as soon as possible, do all that you can do to bring about the strategic transformation of our country's overall level of science and technology [development] from playing catch-up to running alongside [the major powers] to taking the lead, in important areas of science and technology become the leader in the race, become a pioneer in the emerging interdisciplinary fields to create more competitive advantages.³²¹

Xi repeatedly stressed that time was of the essence, noting "science and technology has never before so profoundly affected the nation's prospects and destiny as it is doing today,"³²² and urging action lest "some historic periods of confluence could possibly brush past us."³²³

The third theme was the importance Xi placed on national laboratories and mega-science centers to the success of his drive for indigenous innovation: "We must build national laboratories to a high standard, promote the overall planning for the distribution and optimization of mega-science planning, mega-science projects, mega-science centers, and bases for international science and technology innovation."³²⁴ This statement directly implicated the WIV, as its Center for Biosafety Mega-Science is one of only three such mega-science centers promoted by Xi nationwide.³²⁵

The fourth theme of note was the need for the CAS and the CAE to adhere to the national development strategy of military-civil fusion as a key driver of indigenous innovation:

The vast majority of engineering, science, and technology workers must have the spirit of a craftsman, and must also have a spirit of solidarity, focusing on the major strategic requirements of the state [and] the major engineering and science and technology problems aimed at economic development and matters of national security, adhering closely to...the demands of military-civil fusion, accelerating the transformation of the results of indigenous innovation into applications, and engaging in active warfare in the strategic and forward-looking fields."³²⁶

For more information on this speech as it related to the MCF strategy, see the subsection above, "Military-Civil Fusion: The Catalyst for an Expanding PLA-CAS Partnership."

JUNE 2018: SCIENCE AND FINANCE MINISTRIES **ISSUE DIRECTIVE** TO STATE KEY LABORATORIES

On June 22, the PRC MOST and the Ministry of Finance issued a joint nationwide directive titled “Several Opinions on Strengthening the Construction and Development of State Key Laboratories.”³²⁷ The purpose was to direct state key laboratories, a category that has included the WIV since 2005,³²⁸ to reform in ways that would spur indigenous innovation and propel China to the forefront of global science and technology development. The directive described areas in which these labs were seen as falling short of the party-state’s goals: “[W]hen measured against the requirements [of the state] to improve basic science research and build a global technological power, we are still lacking in major innovative achievements, we do not have enough world-class leading scientists, and the management institutions and mechanisms urgently need to be improved.”³²⁹

The call for improvements to the management of laboratories echoed the statements of many other officials and leading scientists who warned of regulatory gaps and other oversight failures. The directive further stipulated that “strengthening coordinated innovation and promoting military-civil fusion” were among the “basic principles” that scientists at state key laboratories should uphold.³³⁰ It specified that such fusion would involve “military-civil joint construction [of labs]” as part of efforts to “optimize adjustments” to the system of state key laboratories.³³¹ This directive’s description of “military-civil joint construction” of laboratories as an element of MCF may be a reflection of the PLA’s apparent ties to the PRC state-owned company that took over the construction of the BSL-4 laboratory complex at the WIV, pushing out the French firm that Beijing had originally contracted for the project.³³² For more information on the MCF strategy and the collaboration between the WIV and the PLA, see the preceding background sections: “The WIV and the PLA AMMS,” and “Military-Civil Fusion Strategy: The Catalyst for an Expanding PLA-CAS Partnership.”

JULY 2018: XI JINPING ISSUES **“IMPORTANT INSTRUCTIONS”** FOLLOWING VACCINE SCANDAL

On July 20, public outrage erupted after the Jilin Provincial Food and Drug Administration issued a report that the Changsheng Biotechnology Co. Ltd. in the city of Changchun, the capital of Jilin, sold 252,600 doses of ineffective DPT vaccines to inoculate children against diphtheria, whooping cough, and tetanus.³³³ On July 23, an investigation found that the company had further falsified reports on the production and

inspection of some 113,000 rabies vaccines.³³⁴ Premier Li Keqiang released a statement that scolded the company for having “violated a moral bottom line,” and vowed to “resolutely crack down” on such threats to public health.³³⁵ Later that same month, Xi Jinping issued “important instructions” in which he “stressed that party committees and governments at all levels are duty-bound to ensure the safety of medicines, place the top priority on the physical health of the people from the beginning to the end..., improve our country’s vaccine management system, resolutely hold to the bottom line of safety, giving one’s all to safeguard the direct interests of the masses and the big picture of security and stability of society.”³³⁶

AUGUST 2018: CONFLICTING START DATES FOR BSL-4 OPERATIONS AT THE WIV

It is not clear exactly when BSL-4 operations began at the WIV’s laboratory complex at its Zhengdian campus. The BSL-4 lab “formally entered into operations” in August 2018, according to a November 2020 report on the official website of the CAS, the parent organization of the WIV.³³⁷ However, Yuan Zhiming, the director of the WIV’s BSL-4 laboratory, wrote in September 2019 that “the laboratory became operational in early 2018.”³³⁸ A Xinhua English report citing the national health authorities claimed the BSL-4 lab opened on January 4, 2018.³³⁹ An official report from the NPC claimed the BSL-4 laboratory at the WIV “formally entered into operations in 2017.”³⁴⁰ Conflicting reports about when exactly the WIV’s BSL-4 laboratory began operations raise questions about whether safety inspections had been completed in full before experiments with dangerous pathogens began. Similar discrepancies were found with regard to the timing of the accreditation of the BSL-4 lab. See below: “November 2018: Conflicting Accounts of the Accreditation of the WIV’s BSL-4 Laboratory.”

AUGUST 2018: NPC INSPECTS PROVINCES FOR IMPLEMENTATION OF INFECTIOUS DISEASE LAW

On August 20, the official magazine of the NPC reported on the work conducted by the “Infectious Disease Prevention Law Enforcement Inspection Team” since its formation in the spring of 2018.³⁴¹ The inspection team split into four smaller groups to carry out on-the-ground inspections in eight provinces between May and July 2018. They traveled to Yunnan, Guangdong, Sichuan, Fujian, Jilin, Shaanxi, the Inner Mongolian Autonomous Region, and the XUAR. Each of the four teams were led by vice chairs of the NPC Standing Committee and were tasked with inspecting how the provinces were

performing in areas such as enforcing infectious disease prevention laws, formulating supplementary regulations at the local level, raising public awareness, managing the quality of vaccine production, establishing local mechanisms and capacity building for disease prevention and control, and assessing vaccination rates.³⁴²

This effort was clearly undertaken in response to the vaccine safety scandal that occurred at the Changsheng Biotechnology Co. Ltd. in Jilin province, but it is noteworthy that the focus was much broader, targeting infectious disease control and prevention generally, and covering seven provincial-level jurisdictions beyond Jilin. The report noted that China had 41 BSL-3 laboratories at the time, and its first BSL-4 laboratory, the Wuhan National Biosafety Laboratory at the WIV, “formally entered operations in 2017.”³⁴³

SEPTEMBER 2018: WIV DISCUSSES ITS “SHORTCOMINGS” AND THE “STRANGLEHOLD PROBLEM”

On September 10 and 14, the WIV held political study sessions at which a number of its strategic goals and challenges were discussed.³⁴⁴ Brief reports of the meetings posted on the WIV’s website brought into clear focus the state-run nature of the WIV, including its obligations to meet goals set by the central CCP authorities in Beijing. It further suggested that the WIV leadership was already aware of problems that could later have implications for biosafety and biosecurity – problems that would be discussed with greater frequency and urgency in 2019.

Chen Xinwen, director of the WIV from 2008 to late 2018, was described as having brought attention to unspecified “shortcomings and inadequacies in the current work at the CAS,”³⁴⁵ and having “highlighted the imperative to tightly grasp the critical [technological] fields and the ‘stranglehold’ problem that affects the overall situation of the nation and its long-term development.”³⁴⁶ The “stranglehold problem” is a recurring theme of concern at the WIV and among other state-run research entities charged with meeting the science and technology goals set by Beijing. It refers to the “direct [deleterious] effects created by cutting off the supply of foreign key and core technologies” to China,³⁴⁷ which means technologies that China “must import because it is unable to produce them domestically in sufficient quality or quantity.”³⁴⁸

In 2013, Xi Jinping gave remarks that revealed his thinking about the “stranglehold problem,” and articulated the expectations that he placed on Chinese scientists to overcome it:

Overall, there is a disparity between our science and technology and that of developed nations. We must adopt an “asymmetric” strategy to catch up and surpass [them], bringing into full effect our advantages, especially for those core technological fields that we cannot possibly catch up in even by 2050.... In the international arena, those without the advantages of core technologies will also be without political power. In the critical fields, we must concentrate our efforts on the stranglehold areas. Military matters are also the same.³⁴⁹

Returning to the WIV meeting, Chen Xinwen went on to state:

[T]he institute should, under the leadership of the CAS party branch, go further to clarify the line of thinking about its development and the focal points of its work for the upcoming period, and push forward with the establishment of the Center for Biosafety Mega-Science..., complete the work of setting up a system to manage secrets at the institute..., [and] earnestly grasp the building of grassroots party organizations in order to provide a strong political and organizational guarantee for the institute’s science and technology innovation.³⁵⁰

Xiao Gengfu, secretary general of the CCP committee at the WIV, added the following comments:

The current situation for science and technology in our nation is pressing, the challenges are pressing, [and] the mission is pressing. We must persist with the principle of being directed by the requirements [of the state] from the beginning to the end, directed by the problems, directed toward the goals, looking toward the needs of the state, clarifying our own research and development orientation, and with the utmost effort, seek[ing] to solve our shortcomings and the ‘stranglehold’ problem, and mak[ing] contributions to the nation-state, to the people, and to the achievement of the great rejuvenation of the Chinese race.³⁵¹

He Changcai, deputy secretary of the WIV’s CCP Committee, also highlighted the top-down nature of science policy in China: “We must deeply study the spirit of General Secretary Xi Jinping’s important speeches on science and technology innovation, and earnestly meet the CCP Central Committee’s and State Council’s new requirements and deployments for work in science and technology innovation, correctly grasp the strategic

decisions, deployments, and work requirements set by the CAS party organization, [and] take steps to strengthen our sense of mission, sense of urgency, and sense of crisis....”³⁵²

OCTOBER 2018: XI JINPING CALLS FOR SCIENTIFIC “BREAKTHROUGHS” THROUGH MCF STRATEGY

On October 15, Xi Jinping spoke at the second plenary session of the Central Committee’s Commission on Military-Fusion Development, where he “stressed that [the PLA] must strengthen their shouldering of responsibility, firmly grasp implementation..., promote coordinated innovation of science and technology [with civilian institutions], and accelerate the promotion of deep military-civil fusion development.”³⁵³ Like Xi’s two speeches delivered earlier in 2018 on March 2 and March 12, the October 15 speech showed how high of a priority Xi placed on the MCF strategy and how much pressure he was putting on the PLA as well as civilian institutions like the CAS to carry out his vision.

Xi’s speech highlighted the need for indigenous innovation and “breakthroughs” in producing “key and core technologies,” themes that would pervade discourse at the WIV throughout 2019. “You must put all your effort into making breakthroughs with key and core technologies, and establishing a foothold in the most complex and most difficult situations,” Xi said, “Achieve breakthroughs soon by using project development as the driving force and the concentrated advantages and strengths of a coordinated attack.”³⁵⁴ Xi saw barriers to military-civilian integration that he wanted torn down quickly: “You must greatly simplify the examination and approval of projects, lower the threshold for admission, and lower the systemic costs to unleash the productive power of society.”³⁵⁵

OCTOBER 2018: WIV BSL-4 LAB DIRECTOR PENS ARTICLE ON NEED FOR BIOSAFETY SYSTEM

On October 26, WIV BSL-4 Laboratory Director Yuan Zhiming and four other CAS researchers submitted an article for publication in a newly established English language journal for which Yuan serves as one of two editors-in-chief. The article was titled “Studies on Developing a Safe-Management Standard System for Chinese Biosafety Laboratories,” and it was published online in February 2019.³⁵⁶ Yuan and company were frank in discussing the pros and cons of the WIV’s research and the need for greater oversight: “The biosafety laboratory is a double-edged sword; it can be used for the benefit of humanity but can also lead to a ‘disaster.’ With increasing numbers of high-

level biosafety laboratories constructed in China, it is urgent to establish and implement standardized management measures for biosafety laboratories.... Furthermore, these standardized management measures should be implemented as soon as possible to ensure the effective operation of biosafety laboratories.”³⁵⁷

Yuan’s team further observed that China’s existing biosafety standards focused mainly on construction requirements, while “only a small fraction are operational method standards,” meaning labs in China lacked detailed instructions for how to operating safely.³⁵⁸ As this report will later document, Yuan’s phrase “double-edged sword” would reemerge when a pair of PLA AMMS and CAS researchers published a piece warning about the “dangers from internal supervision and regulatory holes” related to biosafety, which was released in December 2019 as SARS-CoV-2 was ravaging Wuhan, though not yet publicly acknowledged.³⁵⁹

Yuan is a central figure in the effort to ascertain the origin of SARS-CoV-2, as he is the president of the Wuhan branch of the CAS and the director of the Wuhan National Biosafety Laboratory.³⁶⁰ Yuan also holds a political role in the central government, as he is a member of the Chinese People’s Political Consultative Conference.³⁶¹ Yuan’s 2018 paper appears to be the first time he discussed biosafety risks in an English language publication, but it was not the first time he had expressed such concerns.

In 2016, Yuan joined four other researchers to publish a piece in the Bulletin of the Chinese Academy of Sciences that offered ideas for improving the planning of high-level biosafety containment labs in China. Yuan’s team was frank about laboratories being insufficiently regulated and lacking standardized operational procedures: “The building of management and support systems, the laws, regulations and systems of standards for high-level biosafety laboratories urgently need to be further improved....”³⁶² They noted how these challenges applied to the WIV, particularly its new BSL-4 facility: “Certain problems exist with aspects of the building and management of our country’s system of high-level biosafety laboratories. At present, only one BSL-4 laboratory has been built in the country, and the management and maintenance of its key equipment and the personnel’s mastery of the standardized operating procedures of BSL-4 laboratories are not mature enough.”³⁶³ As will be discussed later in this report, Yuan penned two more articles in May and August 2019 that would be published in fall 2019, reiterating his concerns about risks at his and other laboratories in China.

NOVEMBER 2018: GUANGZHOU CITY GOVERNMENT DISCUSSES "COMMON PROBLEMS" AT LABS

On November 7, He Tieshan, an official with the Guangzhou Municipal Health Inspection Bureau, delivered a presentation on "common problems" found during biosafety inspections of laboratories working with pathogenic microorganisms within his jurisdiction.³⁶⁴ Guangzhou boasts China's largest manufacturing hub, a major trade port, and ranks as one of its most developed and affluent cities.³⁶⁵ Here are the "common problems" discussed in this report:

- 1) Level 1 and 2 laboratories that have not been registered in accordance with regulations....³⁶⁶
- 2) The entrance to the laboratory does not have biohazard warning signage, or the content of the signage is incomplete, and the exit has no lighted sign for emergency evacuation....³⁶⁷
- 3) [Staff are not] proficient with activating and implementing emergency response plans when sudden accidents occur in laboratories....³⁶⁸
- 4) Incomplete registration information, such as the source of, storage of, and experimental projects involving various bacterial (viral) samples....³⁶⁹
- 5) Lack of a "dual personnel, dual lock" system for refrigerated storage of bacterial (viral) species and positive samples.... [The] drop area does not meet theft prevention requirements....³⁷⁰
- 6) Biosafety cabinets, autoclave machines, and other equipment have not been inspected according to regulations....³⁷¹
- 7) Use of disinfectant products violates regulations: ultraviolet ray disinfectant lamp, disinfectant agents, concentration test cards for disinfectant agents, etc....³⁷²
- 8) Failure to disinfect the area prior to taking care of the disposal of highly dangerous waste such as cultures, samples, and preservation fluid for bacterial and viral strains....³⁷³
- 9) Sub-standard management of the placement of samples after experiments are completed, especially positive samples....³⁷⁴
- 10) Autoclave personnel assuming their post before obtaining a certificate of training....³⁷⁵
- 11) The transfer of medical waste not done promptly, especially harmful waste materials....³⁷⁶

- 12) Laboratory wastewater is directly released into a medical institution's sewage management system....³⁷⁷
- 13) Substandard monitoring of laboratory air and material surface disinfectants....³⁷⁸
- 14) Laboratory personnel do not carry out personal protection measures according to the regulations....³⁷⁹
- 15) Items not related to experiments are stored inside the laboratory, and expired reagents are not removed promptly....³⁸⁰

NOVEMBER 2018: WIV CORONAVIRUS EXPERT DELIVERS KEYNOTE ADDRESS IN SHANGHAI

On November 14, Shi Zhengli, director of the WIV's Research Center for Emerging Infectious Diseases and the CAS Key Laboratory of Special Pathogens, gave a keynote address at a conference held at Shanghai Jiaotong University. Shi's remarks focused on bat coronaviruses and cross-species infections. Shi reportedly discussed how she and her team had used recombinant analysis to determine that the immediate progenitor virus of the human SARS-CoV-1 virus could have recombined in nature from three viruses (WIV1, Rs4231, and Rs4081) that her team had collected from a cave in a rural county called Mojiang in Yunnan province.³⁸¹ Shanghai Jiaotong University has been linked to the research efforts of the PLA, including hacking operations carried out by PLA Unit 61398.³⁸² After the outbreak of SARS-CoV-2, the report of Shi's 2018 address was removed from the university's website.

NOVEMBER 2018: CHINESE SCIENTIST EDITS GENES OF HUMAN EMBRYOS

On November 25, news broke that a team led by He Jiankui, a professor at the Southern University of Science and Technology in Shenzhen Municipality in Guangdong Province, had been recruiting couples to create the world's first gene-edited babies. The team reportedly planned to remove the gene CCR5, with the intention of rendering the offspring resistant to HIV, smallpox, and cholera. He claimed to have altered embryos for seven couples, resulting in one successful pregnancy and the subsequent birth of twin girls two weeks before his unethical activities were uncovered. On November 29, PRC authorities ordered He Jiankui and his colleagues to immediately cease their research, and by late December, the authorities placed He under house arrest. In December 2019,

a court sentenced He Jiankui to three years in prison and fined him 3 million RMB (US\$475,083).

While He's prison sentence in 2019 was clearly an act of official opprobrium, the CCP's initial response to He's findings was laudatory. On November 26, the People's Daily, the official mouthpiece of the CCP, published a story titled "The World's First Gene-edited Babies Genetically Resistant to AIDS Were Born in China." The piece touted He's research as "a milestone accomplishment China has achieved in the area of gene-editing technologies."³⁸³ The piece was soon removed, as international controversy grew.

It is important to note that He's work enjoyed the financial support of both central and local authorities. He was recruited to the university through Shenzhen's "Talent Peacock Plan" in 2012, and he was selected to the central government's top science talent program, the Thousand Talents Plan. He had also received research grants from the Guangdong Provincial People's Government and the PRC MOST. In 2018, He was nominated for the China Youth Science and Technology Award given by the Central Government and the Chinese Association of Science and Technology.³⁸⁴ An official PRC inquiry into the matter claimed that He raised money on his own and acted without official endorsement, but He's gene editing research involving human babies was reportedly supported financially at multiple levels of the party-state.³⁸⁵ This is unsurprising when one considers how the CCP designated gene editing as a field of particular strategic importance for China to develop.

NOVEMBER 2018: **CONFLICTING ACCOUNTS** OF THE ACCREDITATION OF THE WIV'S BSL-4 LABORATORY

Discrepant dates provided in Chinese language reports and English language reports pertaining to when final accreditation was received for the BSL-4 laboratory at the WIV suggest that operations could have begun before the requisite safety inspections were completed and final certification of the facilities had been received. Two Chinese reports indicate that the construction project of the BSL-4 lab at the WIV "passed its final acceptance inspection" on November 27.³⁸⁶

Claims of much earlier accreditation, however, have appeared in English language reports. Seven WIV researchers, including the director of the BSL-4 lab, published a report in an online journal run by the U.S. Centers for Disease Control and Prevention claiming that "[a]fter 2 years of testing and commissioning, Wuhan BSL-4 laboratory

passed a series of assessments, and the China National Accreditation Service for Conformity Assessment certified it as meeting the highest biosafety standard in January 2017,” and that “[i]n August 2017, the National Health Commission (NHC) of China approved research activities involving Ebola, Nipah, and Crimean-Congo hemorrhagic fever viruses at the Wuhan BSL-4 laboratory.”³⁸⁷ In January 2018, WIV researchers told U.S. diplomats that the BSL-4 lab was accredited in February 2017, and that WIV leadership considered the lab “operational and ready for research of class-four pathogens (P4), among which are the most virulent viruses that pose a high risk of aerosolized person-to-person transmission.”³⁸⁸

DECEMBER 2018: WIV’S NEW BSL-4 LAB COMPLEX UNDERGOES ANNUAL BIOSAFETY INSPECTION

On December 4, the Biosafety Committee of the WIV carried out the 2018 annual biosafety inspection of the Wuhan National Biosafety Laboratory, its BSL-4 facility. The purpose of the inspection was “to further strengthen and standardize laboratory biosafety management, audit laboratory management system documents and related biosafety risk assessment reports, and prevent biosafety accidents.”³⁸⁹ The meeting began by listening to a summary report on the laboratory’s operations in 2018, and thereafter “each member of the biosafety committee, in accordance with the content of the audit checklist, conducted on-site inspections and audited documents on the four aspects of laboratory biosafety management, biosecurity management, management of scientific research activities, and the management of the facilities and equipment operation and maintenance....”³⁹⁰ The report’s references to “countermeasures” and “rectification plans” suggested that problems were identified during the inspection: “The committee members and experts proactively spoke up, collectively planned countermeasures, and expressed their views and raised rectification plans.”³⁹¹

The director of the biosafety committee was Shi Zhengli, the WIV’s coronavirus expert and director of its Research Center for Emerging Infectious Diseases. Shi presided over the meeting to review the results of the inspection.³⁹² Shi’s comments also painted a picture of a work in progress:

Shi Zhengli concluded by pointing out that biosafety is no trivial matter and is closely related to the personal safety of laboratory personnel. She emphasized that all departments and staff must implement relevant systems and plans where

it really counts and must certainly do a good job with writing relevant summaries and records; at the same time, they must strengthen safety supervision, actively organize trainings and study sessions, strengthen biosafety awareness, and go the next step to formulate and improve the laboratory biosafety management system to propel the laboratory biosecurity system to a higher level.³⁹³

DECEMBER 2018: WUHAN BRANCH OF CAS ECHOES WIV ON "STRANGLEHOLD" PROBLEM

On December 24, the Wuhan branch of the CAS held an end-of-the-year meeting in which the work of 2018 was recapped and general goals for 2019 were discussed. Echoing the September 10 and 14 reports from the WIV, a senior CCP leader at the branch told its management to "focus on the major science and technology tasks to meet the current urgent needs of the nation and the strategic needs for its long-term development, [and] focus on the 'stranglehold' problem of key and core technologies...."³⁹⁴

DECEMBER 2018: DEADLY LABORATORY EXPLOSION AT UNIVERSITY IN BEIJING

On December 26, an explosion occurred in a laboratory at Beijing Jiaotong University, a well-regarded research university, and produced a fire that burned three students to death.³⁹⁵ A subsequent investigation found that the explosion was caused by mixing magnesium powder with phosphoric acid, which ignited a large fire. The investigation characterized the experiment as a "risky endeavor" that was conducted in violation of university regulations as well as national regulations and laws pertaining to the procurement and storage of dangerous chemical products.³⁹⁶

THE CHRONOLOGY: 2019

JANUARY 2019: WIV TEAM WINS STATE FUNDING TO STUDY BAT SARS-RELATED CORONAVIRUSES

On January 8, the MOST posted on its website a brief summary of 37 research projects in the natural sciences that had been selected for funding awards in 2018.³⁹⁷ Among the projects that received MOST recognition and funding was a study involving five researchers at the WIV, led by coronavirus expert Shi Zhengli, which examined "research on Chinese bats that carry important viruses."³⁹⁸ No further details of the project were provided aside from the project number and institution of affiliation.³⁹⁹ We know,

however, that Shi's study won the State Natural Science Award (Second-Class) for 2018, and she and other prize winners were honored at a ceremony in Beijing attended by General Secretary Xi Jinping and Premier Li Keqiang on January 8.⁴⁰⁰

WIV coronavirus researcher Hu Ben also reportedly received funding in 2018 from the Youth Science Fund Project of the state-funded Natural National Science Foundation of China (NNSFC) to conduct a study starting in January 2019 that would examine the "pathogenicity of two new bat SARS-related CoVs to transgenic mice expressing human ACE2."⁴⁰¹ Hu's study was slated to conclude in December 2021, but no findings have been published to date, and references to the study have been removed from the NNSFC website since the spring of 2020.⁴⁰² SARS-CoV-2 is a beta-coronavirus that binds to the human ACE2 receptor with greater affinity than SARS-CoV-1, and thus could have been within the scope of the work that Hu conducted. According to a Chinese medical science database, another relevant study was being conducted by WIV graduate student Hu Bingjie under the tutelage of Shi Zhengli. It was approved for funding in 2017, commenced in 2018, and was expected to run through December 2021. That study was titled "Study of the Evolutionary Mechanism of Bat SARS-like Coronaviruses' Adaptation to Host Receptor Molecules and the Risk of Cross-Species Infection."⁴⁰³ Our attempts to locate a publication containing the results of this study were unsuccessful. Experts in the field who we consulted agreed that it does not appear that the findings have been published.

The significance of these reports is to show that the WIV's research was broadly funded by the PRC central authorities and had even received honors from them, and that in 2019, the WIV was actively working on at least two projects involving undisclosed SARS-related bat coronaviruses that they were artificially adapting to infect human cells. The WIV, as a local research center of the state-run CAS, answers to and receives regular funding from the State Council, but it also received funding for specific projects related to bat coronaviruses from central government agencies in advance of the outbreak of COVID-19. For this and other reasons, it would be difficult for the central leadership in Beijing to distance itself from a serious research-related incident at the WIV, were such an incident to occur.

JANUARY 2019: MINISTRY OF EDUCATION ISSUES DIRECTIVE ON LAB SAFETY AT UNIVERSITIES

The response by the PRC authorities to the laboratory explosion at Beijing Jiaotong University in December 2018 was swift and broadly targeted at university laboratories throughout China, rather than limited to the institution where the incident occurred, suggesting that the authorities did not regard the incident as an isolated case of a breakdown in biosafety standards, but rather saw it as the result of a more widespread problem of laxity. On January 10, the General Office of the Ministry of Education issued a “Circular Regarding Going a Step Further to Strengthen Safety Inspection Work for Teaching Laboratories at Institutions of Higher Learning,” its first directive of 2019.⁴⁰⁴ The directive required all universities to “strictly investigate” the following five issues: 1) setting up and operating a system of laboratory safety management, 2) laboratory safety education for faculty and students, 3) setting up and operating a system for identifying the source of laboratory dangers and managing them, 4) establishing a system to ensure the safety of laboratory facilities and equipment, and 5) developing emergency response capabilities for laboratory safety incidents.⁴⁰⁵

JANUARY 2019: XI JINPING DISPLAYS UNEASE WITH INTERNAL SECURITY APPARATUS

On January 15, Xi Jinping gave a speech to the CCP Central Political and Legal Commission’s Work Conference, in which he called on internal security officials to, among other things, “uphold the Party’s absolute leadership of political and legal work,”⁴⁰⁶ and “fulfill your professional duties to safeguard the political security of the state, [and] ensure the overall stability of society....”⁴⁰⁷ Xi further pointed out that internal security officials must “have a clear cut stand that places political construction above all else, diligently forging a high-quality, political-legal corps that puts the Party Central Committee’s mind at ease....”⁴⁰⁸ This could be done, he advised, by “accomplishing the Two Upholds [and] vowing to adhere to the cause of becoming builders and defenders of socialism with Chinese characteristics,” stating that “political and legal organs must dare to turn the blade inward, dare to scrape the poison off the bone, dare to eliminate the black sheep who harm the herd.”⁴⁰⁹ The “Two Upholds” refer to upholding Xi as the core leader of the CCP and upholding the absolute authority of the CCP Central Committee.⁴¹⁰

JANUARY 2019: XI JINPING HIGHLIGHTS LABS, BIOTECH IN CONTEXT OF “BLACK SWAN” INCIDENTS

Xi Jinping opened 2019 with an expression of concern about unexpected “major risks” related to biotechnology, among other issues. On January 21, Xi gave a speech to the CCP Central Party School, the theme of which was “adhering to the bottom line in [our] thinking and focusing strictly on guarding against and neutralizing major risks.”⁴¹¹ Many senior CCP, government, and military officials attended Xi’s speech, including members of the Politburo of the CCP Central Committee and the Central Military Commission, as well as numerous senior provincial and ministerial-level officials.⁴¹² According to the New York Times, the meeting was called abruptly and Xi’s speech conveyed an “anxious urgency.”⁴¹³ While many media outlets interpreted Xi’s speech as largely focused on external threats and economic risks, one scholar of Chinese politics noted that Xi’s concerns were much more expansive, spanning both international and domestic issues as well as matters of political and economic importance.⁴¹⁴ The People’s Daily, the CCP’s official mouthpiece, summarized Xi’s comments thusly:

In his speech, Xi Jinping made an in-depth analysis and put forward clear requirements on preventing and neutralizing major risks in the areas of politics, ideology, the economy, science and technology, society, the external environment, and party building. He emphasized that in the face of a turbulent international situation, the complicated and sensitive environment along [China’s] periphery, and the arduous and onerous duties of reform, development, and stability, we must maintain a high level of vigilance from the beginning to the end. We must be both highly vigilant about “black swan” incidents and also guard against “grey rhino” incidents. We must not only go on the offensive to prevent risks, but we must also have masterful strategies to deal with and resolve risks and challenges; we must fight a well-prepared battle to prevent and stand against risks, but also to wage a proactive war to turn dangers into safety and transform crisis into opportunities.⁴¹⁵

According to a study manual for CCP cadres, a “‘black swan’ incident refers to a major incident that is very rare, unpredictable, but [that] as soon as it occurs,...trumps any and all prior experiences,” while a “‘grey rhino’ incident refers to an incident in which the problem is great, and there were early signs, but it was not given sufficient attention, and led to severe consequences as a result.”⁴¹⁶ As illustrated in the People’s Daily quote above, the seven areas that Xi believed could present “major risks,” and potentially give

rise to “black swan incidents” and “grey rhino incidents,” were very broad in scope, and “science and technology” were included among them.

The January 21 speech was not the first instance of Xi using the terms “black swan” and “grey rhino.”⁴¹⁷ It does, however, appear to be the first time that Xi had used these two terms to describe potential problems pertaining to science and technology. Among the specific topics that Xi pointed to as in need of greater attention were the “state key laboratories,” which are state-funded and largely administered by the state.⁴¹⁸ While Xi’s comments were general in nature, and China has hundreds of state key laboratories,⁴¹⁹ we note that the WIV has hosted state key laboratories since 2005, including the CAS Key Laboratory of Special Pathogens, which is part of the WIV Center for Emerging Infectious Diseases led by coronavirus expert Shi Zhengli.⁴²⁰

The People’s Daily summarized Xi’s remarks on science and technology as follows:

Xi Jinping emphasized that security in the field of science and technology is an important component of national security. It is necessary to strengthen system building and capacity building, improve the national innovation system, solve prominent problems such as the duplication of resource allocation, the fragmentation of scientific research capabilities, and the unclear orientation [in terms of] the purpose and lines of innovation, and raise the overall effectiveness of the innovation system. It is necessary to speed up [the process] of addressing these shortcomings and establishing the advantages of independent innovation systems and mechanisms. It is necessary to strengthen strategic research and assessment and forward-looking deployment in major areas of innovation, paying special attention to the strategic positioning of state laboratories, reorganizing the state system of key laboratories, building major bases and platforms for innovation, and improving collaborative mechanisms for innovation between industry, academia, and research institutions. It is necessary to strengthen the overall planning and organization of major scientific and technological duties related to national security and economic and social development, and strengthen efforts to build national strategic scientific and technological capabilities. It is necessary to speed up the establishment of an early warning and monitoring system for scientific and technological safety and accelerate relevant legislative

work in areas such as artificial intelligence, gene editing, medical diagnosis, autonomous driving, drones, and service robots.⁴²¹

The point here is not to suggest that a link exists between Xi's speech and a biocontainment failure in Wuhan; January was several months before the earliest estimated dates of the emergence of SARS-CoV-2. Rather it is simply to highlight that Xi saw biosafety and biosecurity as components of national security and potential sources of unexpected and highly consequential "black swan" and "grey rhino" incidents. Xi further perceived a need for an early warning and monitoring system specifically for safety matters pertaining to science and technology. It is perhaps significant that in late July, just over six months after Xi's speech, the CCP secretary at the WIV held a study session that stressed the importance of Xi's remarks on "black swan" and "grey rhino" incidents.⁴²²

JANUARY 2019: WIV TELLS FRENCH OFFICIALS ABOUT **SHORTAGE** OF POSITIVE PRESSURE SUITS

On January 24, three officials from the Consulate General of France in Wuhan and the Embassy of France in Beijing visited the WIV and met with WIV Deputy Director Gong Peng, Director of the Wuhan BSL-4 Laboratory Yuan Zhiming, and BSL-4 Lab Deputy Directors Shi Zhengli and Song Donglin.⁴²³ A fourth Frenchman named Rene Courcol, identified as a "laboratory quality control specialist," also briefed the visitors and joined them for a tour of the facilities.⁴²⁴ The French government sent Courcol, a microbiologist from Lille University Hospital, to Wuhan in May 2018 to assess the quality of the WIV's work and safety procedures. While the PRC authorities had initially agreed to allow as many as 50 French researchers to conduct experiments at the new BSL-4 laboratory that France helped to build, Courcol was the only one to ever step foot inside the facility.⁴²⁵

The WIV report described Courcol as having delivered a presentation on the establishment of the WIV's quality control system as well as a comparative study of the procedural documents for laboratories in France and China. No further details were disclosed. It indicated that "the two sides also exchanged views and held an in-depth discussion on the organization of a new term of the guiding committee, pathogen resource sharing between China and France, and the export of positive pressure protective suits for P4 laboratories."⁴²⁶ It characterized the French officials as having said they would "actively facilitate exchanges and assist the Wuhan P4 lab in resolving

its shortage of positive pressure protective suits and other problems.”⁴²⁷ It is worth noting that what the WIV report called the “guiding committee” appeared to be a reference to the defunct Franco-Chinese Committee on Infectious Diseases, which stopped meeting in 2016 after its French cochair resigned in frustration over Beijing having reneged on its promises regarding the French role at the WIV.⁴²⁸

For more information on the fraught relationship between the WIV and France, see “Were the WIV’s Biosafety Lapses the Inevitable Fallout from Expelling the French?” in the background section that precedes the chronology.

FEBRUARY 2019: CHINESE EXPERTS HIGHLIGHT BIOTECH RISKS

On February 20, the first two of at least four notable publications in 2019 by prominent Chinese experts pointing to the potential biosafety and biosecurity risks of synthetic biology appeared online. In the first issue of the inaugural volume of the *Journal of Biosafety and Biosecurity*, which is managed by Director of the Wuhan National Biosafety Laboratory Yuan Zhiming, two microbiologists from Tianjin Municipality wrote: “One important biosafety concern in synthetic biology is the intentional or unintentional release of synthetic organisms into the environment during research and application....”⁴²⁹ Echoing Xi Jinping’s speech in January, the two authors went on to explain the dangers associated with genomic editing: “The emergence of CRISPR/Cas9, a new genome-editing technology, has had tremendous effects on the synthetic-biology field. This technology not only improves the accuracy and efficiency of editing of pathogens’, animals’, plants’, and human genomes, but also yields traceless modification of genomes in a short period. Therefore, the technology can be utilized to enhance the pathogenicity, virulence, or transmission of toxins or bacteria....”⁴³⁰

On February 20, a piece written in the same journal by four researchers from the PLA AMMS emphasized that infection through aerosols, which is the chief mechanism of infection for SARS-CoV-2, posed the greatest risk for laboratory-acquired infections when working with viral pathogens. The authors wrote:

The experimental activities in the biosafety laboratory mainly involve sample collection, transportation, receiving, processing, experimental operation and preservation, waste disposal, etc. For each activity, there is a risk that if control methods are improper, pathogens can infect the experimental staff or spread outside the laboratory to infect people in society. The reasons for biosafety

laboratory infections mainly include cuts, acupuncture, direct exposure of skin, mucosa, and eyes to infectious microorganisms, animal bites, inhalation of infectious aerosols, etc. Among them, aerosol infection is the most common, because aerosols are ubiquitous during experiments and are difficult to detect. Laboratory workers at high risk during testing are the key target for prevention of infections in biosafety laboratories.... Studies have shown that there are risks of aerosol exposure in a variety of experimental operations, including high concentration of suction and mixing, ultrasonic lysis, accidental dropping of high-concentration culture bottles, rupture of centrifuge tubes, accidental spillage of freeze-dried powder, accidental squirting when injecting an animal, and animal dissection, etc.⁴³¹

The authors' recognition of the high risk of infection through aerosols in a laboratory setting was a logical implication to draw from the PRC's previously expressed understanding that aerosol delivery of pathogens would be the vehicle of choice for the targeted release of biological agents in modern warfare. For example, in its 2011 submission to the BWC, the PRC Ministry of Foreign Affairs included a subsection on "targeted drug-delivery technology making it easier to spread pathogens" that stated:

Aerosol technology can be used effectively to spread pathogenic microbes, infecting humans through the respiratory tract. And viral vectors can very easily carry special genes into the body, thereby causing damage. Further, there is potential for the effects of aerosol delivery, specifically targeted viral vectors, transfection, and gene expression to combine, greatly increasing the overall effect. Both technologies can be used by certain States and terrorist groups for malicious purposes, efficiently spreading pathogens and disease-causing genes.⁴³²

FEBRUARY 2019: BSL-3 LAB AT WIV'S NEW CAMPUS RECEIVES ACCREDITATION CERTIFICATE

On February 21, the WIV reported that in "recent days" the BSL-3 laboratory that is co-located with and supports the work of the BSL-4 laboratory at the Zhengdian campus had received a certificate of accreditation from the China National Accreditation Service for Conformity Assessment (CNAS).⁴³³ The report indicated that unspecified "non-conforming items" were found during on-site inspections conducted by CNAS in

September 2018 that CNAS required the WIV to address before the BSL-3 laboratory could be certified:

From September 25-28, 2018, CNAS organized experts to conduct the preliminary assessment of the laboratory qualifications of the P3 laboratory. After two and a half days of comprehensive assessment and testing, a thorough document review, on-site inspections of the facility and its personnel, the assessment team unanimously agreed that the hardware facilities of the laboratory satisfied the protection requirements for level-three pathogens. At the same time, specific rectification requirements were put forward regarding non-conforming items that were discovered during the inspection process and [other] observations. With the combined efforts of all of the laboratory staff, all the rectification work was completed by the end of November, and [the laboratory] passed the on-site reexamination on December 1, and finally obtained the CNAS accreditation certificate [in February 2019].⁴³⁴

MARCH 2019: SERIES OF WIV REPAIRS AND RENOVATIONS BEGIN

The WIV submitted several costly procurement requests for major renovation and maintenance projects involving their relatively new BSL-3 and BSL-4 laboratory facilities during the course of 2019, the first two of which were filed in March, according to documents obtained from a Chinese government procurement website. On March 1, the WIV issued a procurement notice seeking contractors to bid on an unspecified maintenance project at a BSL-3 laboratory and the laboratory animal center at the new Zhengdian Park campus, with a budget of approximately US\$38,847 (RMB 260,000).⁴³⁵ This procurement notice, which suggested that the BSL-3 laboratory would soon undergo maintenance, surfaced less than two weeks after the WIV reported that the same laboratory had just received an accreditation certificate after “non-conforming items” had been addressed in late 2018.

On March 21, the WIV issued another procurement notice seeking to purchase 20 positive pressure protective suits, for which it allotted a budget of approximately US\$216,647 (RMB 1.45 million).⁴³⁶ In 2016, the French Dual-Use Commission reportedly declined a WIV request to purchase additional containment suits because the volume was “well above the needs of the Wuhan [lab],” and fueled French concerns that the WIV was engaged in undisclosed military research.⁴³⁷

MARCH 2019: STATE COUNCIL PASSES REGULATIONS ON GENETIC MATERIALS

On March 20, the State Council revised the “PRC Human Hereditary Resources Management Regulations,” updating and replacing provisional measures that were put into effect in 1998.⁴³⁸ The regulations significantly strengthened the state review process for research projects conducted with international institutions or individuals that involved the use of genetic material from Chinese people. They also sought to clarify and further standardize procedures for the use of genetic material in domestic R&D as a matter of “public health, state security, and the public interest.”⁴³⁹ As noted earlier in the background section, PLA strategists have called to restrict foreign access to Chinese genetic material and for more domestic research to map out the Chinese genome to determine any unique genetic vulnerabilities that could be exploited by an adversary developing a biological agent, and conversely, to advance their own understanding of biological agents that would affect other races but not Chinese.⁴⁴⁰ Premier Li Keqiang signed the regulations on May 28, and Xinhua publicized the regulatory change on June 10. They took effect less than a month later on July 1.⁴⁴¹

MARCH 2019: CUSTOMS INCREASES BIOSECURITY MEASURES AT PORTS OF ENTRY

On March 24, Zhang Jiwen, the Director of the PRC State Customs Administration, spoke to a national meeting of customs officials and drew their attention to the importance of carrying out instructions from Xi Jinping regarding biosecurity at ports of entry. Zhang said, “[P]ersisting with the implementation of the spirit of General Secretary Xi Jinping’s various important oral and written instructions, and in accordance with the deployment requirements of the National Customs Work Conference, [we must] use the strictest measures in an all-out effort to ensure the biosecurity of the nation’s gates, and to firmly construct an epidemic inspection line of defense at our ports of entry....”⁴⁴² A series of safety drills and table top exercises, primarily held at airports, would be carried out in various cities around China subsequent to Zhang’s speech, and some of them cited Xi’s instructions as the impetus for the drills. These safety drills will be detailed later in this report.

MARCH 2019: GEORGE GAO SHARES CONCERNS ABOUT BIOTECH RISKS

On March 25, George Fu Gao, the director-general of the CDCP, published an article online in the journal Biosafety and Health, which is jointly run by the CDCP and the

Chinese Medical Association.⁴⁴³ Gao also holds a professorship in the Institute of Microbiology at the CAS, and is president of the Chinese Society of Biotechnology.⁴⁴⁴ Like the two microbiologists from Tianjin writing in February 2019, Gao's commentary warned about the inherent risks of genomic editing and synthetic biotech:

Advances in biomedical technologies, such as genome editing and synthetic biotechnology, have the potential to provide new avenues for biological intervention in human diseases. These advances may also have a positive impact by allowing us to address risks in new approaches. However, the proliferation of such technologies means they will also be available to the ambitious, careless, inept, and outright malcontents, who may misuse them in ways that endanger our safety. For example, while CRISPR-related techniques provide revolutionary solutions for targeted cellular genome editing, it can also lead to unexpected off-target mutations within genomes or the possibility of gene drive initiation in humans, animals, insects, and plants. Similarly, genetic modification of pathogens, which may expand host range as well as increase transmission and virulence, may result in new risks for epidemics. For example, in 2013, several groups showed that influenza H5N1 viruses with a few nucleotide mutations and H7N9 isolates reasserted with 2009 pandemic H1N1 virus could have the ability for airborne transmission between ferrets. Likewise, synthetic bat-origin SARS-like coronaviruses acquired an increased capability to infect human cells. Thus, modifying the genomes of animals (including humans), plants, and microbes (including pathogens) must be highly regulated.⁴⁴⁵

Gao's views are consistent with previous PRC official statements on the weaponization of synthetic biology. For example, in its 2011 submission to the BWC, the PRC Ministry of Foreign Affairs included a subsection on "synthetic biology enabling the creation of man-made pathogens" – a reference to the gain-of-function research conducted at the WIV and other laboratories that had emerged as a cause of controversy in the scientific community worldwide. The submission stated such research had "the potential to be used for evil ends," because it "could be used in the future to create pathogens of even greater toxicity and infectiousness than those currently known...."⁴⁴⁶ It went on to describe how "microbial genomic research can enhance the virulence or pathogenicity of a pathogen by modifying its antigenic properties,"⁴⁴⁷ further noting: "[T]he sequencing of pathogen DNA has helped develop new drugs and vaccines. But the same data can

also be used to synthesize new pathogens and modify pathogen antigenicity, infection specificity, toxicity, and resistance to drugs, causing traditional means of dealing with infectious disease to fail and rendering the prevention and control of such disease even harder.”⁴⁴⁸

MARCH 2019: NPC DECIDES BIOSECURITY LAW IS A **PRIORITY** FOR 2019

On March 26-27, the NPC had a meeting to discuss its legislative agenda for the upcoming year, where it was decided that a biosecurity bill would be designated a top priority, and placed on an accelerated course for drafting, review, and passage, with the first reading to be completed in 2019.⁴⁴⁹ An analyst of the NPC noted that while the biosecurity bill was included in the NPC Standing Committee’s 13th Legislative Plan approved in September 2018, the bill was categorized among the lower-priority projects, and it appeared that CCP leadership only decided it would be a higher priority in 2019, perhaps in response to the November 2018 CRISPR-baby scandal.⁴⁵⁰

The March report did not specify the reason why the biosecurity law went from a low to high priority in less than six months, but it implied that the decision was connected to “some biosafety incidents in our country reported by the media in recent years that aroused a high-level of international and domestic attention.”⁴⁵¹ Just a month earlier on February 25, Xi Jinping called for the NPC “to use legislation to ensure high-quality development and accelerate the economy’s sustainable and healthy development,” and the biosecurity bill was among the items Xi singled out in this regard.⁴⁵² Xi’s comments likely spurred the NPC’s reprioritization of its legislative agenda.

APRIL 2019: WIV HOLDS ANNUAL MEETING ON **BIOSAFETY AND BIOSECURITY WORK**

On April 3, the WIV held its annual work conference on lab security and safety.⁴⁵³ Comments from its leadership suggested some concern about laxity and emphasized the importance of biosafety measures in advance of key political anniversaries in 2019. He Changcai, the deputy secretary of the CCP committee at the WIV, pointed out:

This year is the 70th anniversary of the founding of a new China and the 70th anniversary of the founding of CAS.... Doing a good job with our work [to maintain] safe production is extremely important. We must start by speaking from the high point of politics to understand safe production. We must firmly

establish the concept of safe development, treat safe production from the perspective of practicing the “Two Upholds”..., at all times tighten the string of safe production and sound the alarm bells, always grasp unrelentingly, and strive to create a good environment for scientific and technological development.⁴⁵⁴

He’s comments came just two days after CCP leaders at the Wuhan CAS held a meeting with WIV personnel to brief them on an “extremely accurate and detailed report” of the problems uncovered during a recent “political inspection tour” of the lab, suggesting heightened political scrutiny of the lab.⁴⁵⁵

He Changcai further clarified that WIV researchers were accountable to both the CCP and the government, and that both the technical experts serving as officials at the WIV in a state capacity and CCP officials at the WIV would be held responsible for the WIV’s work:

He emphasized the strict implementation of the requirements of the safety management responsibility system to “be responsible to the party and government, a single post has dual responsibilities [to the party and government], joint control and shared management [between the party and government], [and] the holding of those accountable for dereliction of duties,” and to insist on the “imperative to manage safety while managing professional work, and the imperative to manage safety while managing production,” it is imperative that both aspects of the work advance side by side.⁴⁵⁶

He called on WIV managers to “strictly abide by the system of various national laws as well as the rules and regulations of the CAS and the WIV on safety management, strengthen day-to-day safety management, and at unscheduled times, launch self-inspections of safety [conditions] and rectification of hidden dangers....”⁴⁵⁷

Wang Yanyi, the director of the WIV, also delivered remarks, opening with the assertion that “the safety work of the institute is the precondition and guarantee for succeeding at all of the other work at the institute.”⁴⁵⁸ Wang continued with He’s theme of holding researchers accountable for safety incidents: “She demanded 1) the strict implementation of the safety work responsibility system, tightly integrating safety management work with the professional work of research and development, reaching the point where the two are ‘planned together, deployed together, inspected together,

summarized together, and evaluated together'; 2) all operations inside the laboratory must be carried out in strict adherence to professional standards and procedures with no tolerance for any kind of wishful thinking; 3) take steps to strengthen safety management for students."⁴⁵⁹

Wang Yanyi closed with the following admonition: "Safety work is no trivial matter. You must at all times tighten the string of safe production, reaching the point that no regulation and no action has been overlooked. When you discover problems, promptly rectify them in a satisfactory manner."⁴⁶⁰ While the aforementioned WIV report was dated April 8, 2019, the webpage URL and the time stamp from Google search results both indicated that the report was not posted until November 11, 2019, which as we will document later in this report, was concurrent with when the WIV was dealing with the fallout of what appears to have been a major biosafety incident.

APRIL 2019: WIV SIGNS JOINT RESEARCH AGREEMENT WITH JINYINTAN HOSPITAL

On April 23, the WIV and the Wuhan Municipal Jinyintan Hospital signed a research cooperation agreement.⁴⁶¹ WIV Director Wang Yanyi and Wuhan Jinyintan Hospital Director Zhang Dingyu attended the signing ceremony along with other leaders from both sides. During the ceremony, Zhang said the hospital was undergoing a phase of rapid development and expressed hope that it could start cooperation with the WIV in the areas of hand, foot, and mouth disease, HIV/AIDS, influenza and upper respiratory infectious diseases, and tuberculosis. The goal, as Zhang explained it, was to facilitate the integration of basic research, translational medicine, and clinical practice, and to enhance the scientific research capacity of both the WIV and the Jinyintan Hospital. The research cooperation agreement would help build a national-level technical platform for clinical trials, according to Wang Yanyi, and contribute to the nation's public health infrastructure by building capacity to respond to infectious diseases.⁴⁶² It is worth noting that the first confirmed cases of COVID-19 – at least the earliest that the authorities have disclosed – were diagnosed in patients treated at Jinyintan Hospital.⁴⁶³

April 2019: Deputy Director of CAS Leads Safety and Security Inspection at the WIV

On April 28, Wang Shuzhi, deputy director of the General Office of the CAS in Beijing, led a group of experts to "investigate and study" the WIV's safety and security work. The group carried out "on-the-spot" inspections of the WIV's water and electricity consumption, fire protection and anti-theft measures, its storage of hazardous chemicals,

and its sorting and classification of biowaste.⁴⁶⁴ At a meeting held after the inspection, a report was delivered on the WIV's safety and security work, and the participants engaged in a focused discussion on "the plan for upgrading the security facilities of the Zhengdian Scientific Research Park."⁴⁶⁵

The report stated that Wang "affirmed the effectiveness of the WIV's security work and put forward suggestions to improve the [facilities] upgrade plan." Another comment, however, suggested that Wang did not judge the WIV's safety and security measures to be sufficiently systematized: "He required that the WIV establish a sound security management system, [and] improve the mechanisms of its security work..."⁴⁶⁶ Wang did not explain why it was that a facility billed as state-of-the-art, which had only recently begun operations, was already in need of an "upgrade plan." It was also not clear if the aforementioned procurement notices for lab maintenance on March 1 and the purchase of positive pressure suits on March 21 were part of that "upgrade plan."

APRIL 2019: WIV TELLS **YOUNG RESEARCHERS** TO BE A FORCE THAT THE CCP CAN TRUST

On April 29, the WIV held a special training for young researchers on "Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era." More than 80 junior staff, both CCP members and non-members alike, attended the training.⁴⁶⁷ Li Li, the deputy director of the Office of the WIV CCP Committee, called Xi's thought a "sharp ideological weapon" to cut through various difficulties, and urged the young researchers to "launch research and development work [and] become the courageous fighters of this era under the leadership of the party, standing squarely on the demands of the state."⁴⁶⁸ He Changcai, the deputy secretary of the CCP committee, also told the young researchers: "CAS, as a national strategic science and technology force that the Party, the state, and the people can rely on and trust, bears the weight of the mission to build our country into a global power in science and technology. For the young people of the CAS, you were born at an opportune time, but a heavy responsibility also rests on your shoulders."⁴⁶⁹

MAY 2019: NHC HOLDS WORK CONFERENCE ON **"SAFE PRODUCTION"**

On May 8, the NHC held a virtual work conference by video teleconference with health officials from all around China.⁴⁷⁰ The conference emphasized the sense of responsibility and urgency that officials should feel when implementing safety measures, particularly

to “ensure that no major safety or security accidents occur” and maintain stability in the lead up to the 70th anniversary of the founding of the PRC in October 2019.⁴⁷¹ Among the directives given by NHC to local officials was the following warning about laboratories: “Do a good job with supervising and regulating high-level biosafety experimental activities and managing high-grade cultures of pathogenic microorganisms.”⁴⁷²

MAY 2019: WIV HOLDS MANDATORY **STATE SECRETS TRAINING** FOR RESEARCHERS

On May 10, Xiao Gengfu, the CCP party secretary at the WIV, required all of the WIV’s professional research personnel, postdoc researchers, and graduate students to attend a training session on the protection of state secrets, and sign pledges to protect classified information pertaining to their research at the WIV.⁴⁷³ Tang Kaihong, a local official from China’s National Administration for the Protection of State Secrets, discussed the national security risks involved with the institute’s research and warned of infiltration efforts by foreign spies, according to an account published by the WIV’s parent organization, the CAS.⁴⁷⁴ The WIV also published its own report about the training, but while the WIV report was dated May 13, 2019, the webpage URL and the time stamp from Google search results both indicated that the report was not posted until November 11, 2019, which as we will document later in this report, was concurrent with when the WIV appeared to be dealing with the fallout from a major biosafety incident.⁴⁷⁵

Tang Kaihong’s reported comments shed light on the state-run nature of the WIV and the CCP’s goal to prevent the outside world from knowing the details of the WIV’s work. Tang “raised detailed preventive measures to address the hidden dangers of using mobile phones,”⁴⁷⁶ and said:

[A]s our country’s comprehensive national power has continuously increased, with the speedy development of informatization, and the continued advancement of big data, cloud computing, artificial intelligence, and other technologies, external espionage and intelligence organizations are increasingly active in targeting our country through intelligence infiltration, [and] the situation for protecting security secrets is increasingly complex and grim. Therefore, we must securely establish the “holistic view of national security,” take steps to strengthen awareness of [the need to] protect and prevent security secrets [from vulnerabilities] on the Internet, mobile phones, and in other emerging areas, [and]

master the basic knowledge and technical skills in order to improve our ability to protect security secrets, counter traitors, and prevent spies.⁴⁷⁷

The importance of protecting state secrets also featured as a key subject of a “national security education” meeting held for CCP members at the WIV on April 26, 2019, as well as at the basic training that the new class of graduate students at the WIV received on September 3, 2019.⁴⁷⁸

MAY 2019: DIRECTOR OF BSL-4 LAB DRAFTS SECOND ENGLISH PAPER ON BIOSAFETY ISSUES

On May 15, Yuan Zhiming, the director of the Wuhan National Biosafety Laboratory, submitted an article for publication in the newly established English language Journal of Biosafety and Biosecurity, for which Yuan serves as one of two editors-in-chief.⁴⁷⁹ The paper was titled “Current Status and Future Challenges of High-Level Biosafety Laboratories in China.” Yuan discussed concerns about biocontainment labs in China, including the WIV, ranging from neglected maintenance costs and insufficient operational funds to a lack of specialized managers and engineers to operate the labs.⁴⁸⁰ Yuan’s paper also pointed to lax enforcement (“enforcement still needs to be strengthened”) of existing regulations pertaining to pathogen, waste and laboratory animal management, and warned that such uneven implementation “puts biosafety at risk.”⁴⁸¹ Yuan submitted a revised version of the paper on September 10, and it was published online on October 24.⁴⁸² The timing of the paper’s revision and publication corresponded roughly with other significant events at the WIV and nearby, which will be discussed later.

MAY 2019: SECOND HIGHEST OFFICIAL FROM CAS INSPECTS WUHAN’S PARTY BUILDING EFFORTS

From May 27 to 28, Hou Jianguo, then deputy secretary of the CAS Party Organization in Beijing and vice president of the CAS, visited the Wuhan branch of the CAS to investigate its efforts to build the CCP’s organizational presence and its recruitment and cultivation of talented CCP cadres.⁴⁸³ Hou’s visit, along with a slew of subsequent reports, illustrates the high degree of CCP penetration of the CAS and the WIV, and the CCP’s preoccupation with maintaining a political focus on what are ostensibly centers of scientific research. Hou “emphasized that under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, we must strengthen the ‘Four

[Types] of Consciousness,' fortify the 'Four [Types] of Self-Confidence,' and resolutely achieve the 'Two Upholds.'" Hou urged the WIV, "Maintain a high degree of consistency with the Party Central Committee with Comrade Xi Jinping at the core in your political stance, political direction, political principles, and political path from the beginning to the end."⁴⁸⁴ Hou advised the WIV to "strictly avoid formalism and bureaucratic thinking,"⁴⁸⁵ previewing a criticism of lackluster compliance with political edicts that would be levied at the CAS and the WIV later that year.

MAY 2019: PLA HOSPITAL NEAR WUHAN MAKES POLYMERASE CHAIN REACTION EQUIPMENT PURCHASE

On May 27, the PLA Air Force Airborne Corps Hospital located in Xiaogan Municipality, Hubei Province (approximately 37 miles northwest of Wuhan) made a purchase of polymerase chain reaction (PCR) testing equipment (a fluorescent quantitative PCR instrument), according to analysis by an Australian cybersecurity research firm.⁴⁸⁶ The PLA Air Force Airborne Corps Hospital also took control of medical supply logistics in Wuhan during the height of the coronavirus outbreak in early February 2020, dispatching a team of 260 officers and 130 military trucks.⁴⁸⁷ The PLA's purchase of PCR testing equipment in May 2019 was the first of a series of purchases from mostly state-run institutions in Hubei province to be documented. All in all, spending on PCR equipment in Hubei province jumped from 36.7 million RMB in 2018 to 67.36 million RMB in 2019.⁴⁸⁸

JUNE 2019: COMMUNIST PARTY DIRECTS WIV'S OPERATIONS, URGES "LEAPFROG DEVELOPMENT"

On June 10, a CCP official from Hubei Province was sent to the WIV to examine its efforts to expand the party's presence within the institute. The official's assessment was laudatory, noting that the WIV had "realized the organic fusion of party building and professional work, and had reached [the standard] of complete coverage and no blind spots in its party building work."⁴⁸⁹

On June 20, the WIV held the first of three study sessions on Xi Jinping's admonition to CCP members to "stay true to our original aspiration and keep firmly in mind our mission." Xiao Gengfu, the secretary of the WIV's CCP committee, explained what this meant for the WIV: "The Wuhan Institute of Virology, as a research and development institute of the state, our original aspiration and mission is simply to 'innovate science

and technology, serve the state, [and] create prosperity for the people.’ After going through this study session, we must consciously measure our work against the benchmark of the state’s demands for science and technology innovation work....”⁴⁹⁰ Less than a month later, Xiao reiterated this point: “Those responsible for the research center must fully achieve the effect of setting an example through their work, raising politics to an important place [in their work], keeping firmly in mind the original aspiration of ‘innovating science and technology, serving the state, making the people prosperous’ and the mission of ‘establishing [China] as a world power in science and technology.’”⁴⁹¹

On June 24, the WIV held a second study session on the theme of “staying true to our original aspiration and keeping firmly in mind our mission.”⁴⁹² A senior CCP official noted that “formalistic and bureaucratic ways of doing things are current prominent contradictions and problems inside the party,”⁴⁹³ and called on WIV personnel to address these problems, which essentially refer to superficial conformity with the CCP’s political demands in form, but not in substance.⁴⁹⁴ The same official also alluded to the precariousness of the WIV’s development: “Currently, the work of planning and establishing the Center for Biosafety Mega-Science [at the WIV] is at a critical stage. This not only requires the vast majority of management personnel to continuously raise their outlook, quality, and capabilities to complete the work of shouldering responsibility, leading the troops well, and implementation, but also requires full coordination between each department, [and] from this [we can] do a better job of escorting the convoy of science and technology innovation work.”⁴⁹⁵

On June 27, the CCP branch at the Zhengdian Laboratory Campus of the WIV was selected as a “Red Flag Party Branch,” besting more than 7,000 grassroots party branches that are directly under the supervision of the Hubei Provincial CCP Committee. The Zhengdian Laboratory CCP Branch was commended for its diligent study of Xi Jinping Thought, and for “persisting with the strengthening of minds and molding of souls, exerting themselves to raise the quality of political ideology among party members and cadres..., [and] persisting with the building of a strong combat fortress from the beginning to the end....”⁴⁹⁶

On June 28, the WIV held a general assembly and political study session to celebrate the 98th anniversary of the founding of the CCP. The entire WIV management and more

than 150 of its personnel who are CCP members attended the event.⁴⁹⁷ All participants were required to stand up and publicly “renew the oath that they took when they joined the party,” and 20 of them were recognized as “Excellent Communist Party Members of 2019.”⁴⁹⁸

These five reports, published in less than a month’s time, show that science, like most fields of professional endeavor in China, is thoroughly permeated by CCP political influence and varying degrees of direct control, particularly at state-run research institutions such as the CAS and the WIV. These reports were not isolated, or confined to the month of June, but rather were representative of a steady stream of political discourse at the CAS in general and the WIV in particular. Nine reports of political meetings were published on the WIV website in July 2019 alone,⁴⁹⁹ and four reports in August 2019.⁵⁰⁰

These reports illustrate how the CCP dictates to the CAS the goals to which its research must be oriented and pressures its leadership to deliver results. For example, the CCP official who led the study session above urged WIV personnel to “enthusiastically throw yourselves into the work of CAS [to achieve] the ‘Three Orientations’ and the ‘Four Firsts.’”⁵⁰¹ The “Three Orientations” refer to “orienting toward [reaching] the world’s frontier of science and technology, orienting toward [meeting] the major needs of the state, and orienting toward the major battlefields of the national civilian economy.”⁵⁰² The “Four Firsts” refer to Xi’s edict that the CAS should become a pioneer in four areas to, among other things, achieve leapfrog development in science and technology (see earlier subsection called “Pleasing the Party”). In September 2019, the CCP conducted a political inspection of CAS headquarters in Beijing that produced a number of criticisms of the CAS, including the “persistent gap between the spirit of General Secretary Xi Jinping’s important instructions on the ‘Three Orientations’ and ‘Four Firsts’ and their implementation [at the CAS].”⁵⁰³ Another indicator of the WIV’s status as an extension of the party-state is its involvement in projects related to Xi’s signature Belt and Road Initiative.⁵⁰⁴

JUNE 2019: WIV STILL STRUGGLING WITH “STRANGLEHOLD PROBLEM”

The WIV published three separate reports in June that cited the problem of stranglehold technologies, which would reemerge in a key WIV report in November 2019. On June 10, a visiting CCP official from Hubei province praised the WIV for its efforts to solve

the problem: “To address the ‘stranglehold’ problem of importing key and core equipment that could occur, [your team] organized a specialized working group to carry out technological [efforts] to tackle the problem, and to procure and develop domestically produced substitutes.”⁵⁰⁵ On June 20, WIV CCP Secretary General Xiao Gengfu urged WIV personnel to “focus on the ‘stranglehold’ problem within the realm of biosafety, put forward plans to resolve the problem, and by tackling this thorny problem, overcoming the challenges, and earnestly pushing forward the construction and development of the Center for Biosafety Mega-Science, [we can] help the development of science and technology for the nation.”⁵⁰⁶ On June 27, the Zhengdian Laboratory Party Branch was honored as a “Red Flag Party Branch,” and in the commendation it received, an area in which its success was recognized was having “launched management exchanges and independent research and development centered on the technology stranglehold problem.”⁵⁰⁷

JUNE 2019: WIV FORMS **PARTNERSHIP** WITH HOSPITAL THAT LED THE FIGHT AGAINST SARS

On June 27, Guan Wuxiang, the deputy director of the WIV, led a delegation of WIV researchers on a visit to Guangdong Province in southern China, where they called on the Guangzhou Municipal No. 8 People’s Hospital, which is known for its central role in combatting the SARS epidemic in 2003-2004. The purpose of the visit was to sign a “strategic cooperation agreement” to jointly combat the outbreak of infectious diseases.”⁵⁰⁸ The report documenting the visit on the WIV website explained:

Emerging and sudden outbreaks of infectious disease and major infectious disease have a bearing upon the health of the people, social stability, and national security, [and] the Wuhan Institute of Virology and the Guangzhou No. 8 People’s Hospital each boast advantages and distinguishing characteristics with regards to basic research and the clinical treatment of infectious diseases. The two parties in the future, taking the signing of the strategic cooperation agreement as a new starting point, will launch comprehensive cooperation and jointly make important contributions to our country’s prevention and control efforts for emerging and sudden outbreaks of major infectious diseases.⁵⁰⁹

JUNE 2019: LEGISLATURE PASSES LAW ON **VACCINE SAFETY**

On June 29, the Standing Committee of the NPC adopted a Vaccine Administration Law, which took effect in December 2019.⁵¹⁰ The law was China's first attempt to regulate vaccines in a comprehensive manner, and among other things, it established a regulatory system covering the entire life cycle of vaccines, created a vaccine marketing authorization holder system, codified the legal responsibilities of all parties involved in the vaccine production process, and clarified the compensation available to individuals who experience abnormal reactions to a vaccination.⁵¹¹

For the purpose of this study, it is important to note that this legislation was reactive. PRC authorities were clear that they drafted and passed the law in response to a vaccine safety scandal that occurred at the Changsheng Biotechnology Co. Ltd. in the city of Changchun in July 2018.⁵¹² The company was found to be selling ineffective vaccines, including those intended for children, and its leadership became the subject of a corruption probe.⁵¹³ The NPC drafted and passed the vaccine law less than a year after Xi issued an instruction to do so. Eleven days after passing the vaccine law, the NPC turned its attention to drafting a broader biosecurity law, which was also done at Xi's direction. As was the case with the vaccine law, the CCP leadership was clear about the urgency for the biosecurity law, but unlike the vaccine law, they were not explicit about what motivated them to prioritize the biosecurity law over other bills in the docket to be drafted.

JULY 2019: RESEARCHERS WHO SENT PATHOGENS TO THE WIV EXPULSED FROM CANADIAN LAB

On July 5, Chinese virologist Qiu Xiangguo, her spouse and molecular biologist Cheng Kending, and several of their students from China were expelled by Canadian authorities from Canada's only BSL-4 laboratory, the National Microbiology Lab in Winnipeg, and placed on administrative leave for an unspecified "policy breach" as the Royal Canadian Mounted Police conducted an investigation.⁵¹⁴ The couple's employment was formally terminated in January 2021,⁵¹⁵ and as of June 2021, the couple remained under investigation, possibly for espionage.⁵¹⁶ Canadian authorities initially described the incident as a purely administrative matter, but since 2021, they have acknowledged it is a matter of national security.⁵¹⁷

For the purposes of this study, it is important to note Qiu Xiangguo's connections to the WIV. Four months before she was escorted out of Canada's most sensitive

biocontainment laboratory, Qiu sent 15 samples (two vials each) of various strains of the two paramyxoviruses Ebola and Nipah to the WIV. Canadian health authorities denied at the time of her eviction from the lab that Qiu's removal was related to the sharing of samples with the WIV.⁵¹⁸

Qiu Xiangguo made at least five trips to China in 2017 and 2018, including two visits per year to the Wuhan National Biosafety Laboratory for up to two weeks each visit. In at least one of those biannual visits to the WIV, Qiu trained scientists and technicians at its newly opened BSL-4 lab. Qiu further met with collaborators in Beijing in September 2017, but their names were blacked out in the documents released to a journalist by the Canadian government.⁵¹⁹ The PLA AMMS Institute of Microbiology and Epidemiology, a research partner of the WIV, is based in Beijing. While it is not clear if Qiu met with PLA AMMS counterparts because the names of her collaborators were blacked out, we do know from Qiu's publications that she has collaborated with AMMS researchers based in Beijing and Changchun.⁵²⁰ No references to Qiu's visits were found on the WIV website.

JULY 2019: WIV LEADERS DISCUSS LAB'S "SHORTCOMINGS" AND "FOUNDATIONAL PROBLEMS"

On July 8, Xiao Gengfu, the CCP secretary at the WIV, held a political study session with WIV management that led to a discussion of problems with the facilities and operations at the new BSL-4 laboratory at the WIV. In keeping with Xi's admonition to "be good at making up the shortcomings, and even better at stressing the importance of reinforcing the foundation," the meeting participants "had an animated discussion focused on addressing current shortcomings and foundational problems that exist in the construction, operational processes, and maintenance processes of the P4 laboratory."⁵²¹ Xiao Gengfu summarized the discussion thusly: "[M]embers of the group of party leaders went through a deep investigation and study, and a wide-ranging [process] of soliciting opinions, in order to fully understand and recognize the shortcomings and foundational [problems] limiting the institute's development, and [they] raised measures that were targeted and could be operationalized to resolve [those problems]."⁵²²

Xiao Gengfu concluded by noting that "building the Institute's Center for Biosafety Mega-Science not only requires research staff to personally strengthen their awareness

of unexpected risks, to prevent and control the risks of [the spread of infectious disease] at all times, but also requires the management personnel for research support departments to raise the quality and increase the effectiveness of their work and earnestly serve the institute's development of science and technology innovation."⁵²³

JULY 2019: LEGISLATURE BEGINS DRAFTING BIOSECURITY BILL

On July 10, Li Zhanshu, the third highest ranking member of the CCP Politburo Standing Committee and the Chairman of the NPC Standing Committee, chaired a symposium to discuss drafting a biosecurity law, and framed the initiative as a response to Xi Jinping's instruction.⁵²⁴ Li called on cadres to "strengthen awareness of unexpected developments to the point that you think of danger even in times of safety."⁵²⁵ Li continued:

The Central Committee with comrade Xi Jinping as its core has placed a high degree of importance on the problem of biosecurity. General Secretary Xi Jinping has given important instructions on many occasions, and clearly pointed toward the direction that biosecurity work should go, and provided rules to follow. [We must] deeply carry out the instructions and requirements of General Secretary Xi Jinping, insist on the necessity and urgency of the biosecurity law based on an full awareness of the holistic view of national security, use legislation to establish a basic system and principles for the realm of biosecurity, give prominence to risk prevention, [and] use the law as a weapon to defend the biosecurity of the state and guarantee healthy lives for the people.⁵²⁶

Another of Li Zhanshu's comments suggested he was concerned about the misuse of biotechnology: "[We must] use legislation to guide and standardize the research and application of human biotechnology to walk the correct path, spur the healthy and speedy development of biotechnology, [and] prevent and reduce the dangers and losses that could occur."⁵²⁷

July 2019: WIV's Junior Managers Told to Focus on Problem-Solving

On July 12, the WIV held a political study session specifically for young cadres and junior managers that was presided over by He Changcai, the deputy secretary of the CCP committee at the WIV.⁵²⁸ In addition to the usual discussions of Xi Jinping Thought and the necessity for the WIV to meet the science and technology goals set by Beijing, He made comments that seemed to speak to the practical challenges of running a laboratory

that junior managers faced, and suggested that there may have been some aversion among them to dealing with certain problems: “Young management personnel should persist with orienting their work toward the problems, center their attention on the institute’s core projects, solve difficult problems with R&D services, identify the outstanding problems that are affecting the management of the institute, and squarely face the problems [in order to] solve the problems.”⁵²⁹

JULY 2019: WIV REQUIRES RENOVATION OF ITS HAZARDOUS WASTE TREATMENT SYSTEM

On July 16, the WIV issued its third notice of the year on the official procurement website of the PRC central government that was related to renovation or maintenance of major systems in its laboratory facilities. In this case, the WIV solicited contractors to renovate the hazardous waste treatment system at the BSL-4 lab on the Zhengdian Park campus.⁵³⁰ While reports conflict about when exactly the BSL-4 lab became operational, it was no more than two years before this tender was issued, and likely about one year in advance of this repair being needed. A contractor was selected on July 31 with a budget of approximately US\$147,319 (RMB 986,000), suggesting a major overhaul was necessary.⁵³¹ This project may have been part of the facilities’ upgrade plan that the WIV discussed with senior CAS officials from Beijing on April 28.⁵³²

July 2019: WIV Discusses “Hidden Safety Dangers,” Mid-Level Management Problems

Echoing reports in June, a political study session held at the WIV on July 17 alluded to biosafety problems with its BSL-4 laboratory: “The party members in attendance expressed their views and recommendations targeted at improving biosafety theory and biosafety technological training, and the system for screening and managing hidden safety dangers, as well as the sharing of high-precision instruments, the overall [process] of moving to the Zhengdian laboratory, and other issues.”⁵³³ Two additional reports published on July 19 reiterated concern about the quality of the WIV’s professional management first expressed by Xiao Gengfu on July 8. He Changcai, Xiao’s deputy on the WIV’s CCP committee, called on managers to “strengthen awareness of [the importance] of shouldering responsibility, daring to take responsibility, daring to accept the challenge of difficulties, exceling at steeling yourselves through your work, accumulating experience, elevating yourselves, and harvesting the [personal] growth [that results].”⁵³⁴

In another meeting, He Changcai lectured mid-level managers about the need to shape up:

Mid-level management cadres need to put stress on elevating your own capabilities, especially placing importance on study, study that leads to an awakening, study that leads to gains, using study to direct your work, and using study to give impetus to your work. In your work, you must have unrelenting determination, you must excel at scientific thinking, orient yourselves towards the problems, firmly grasp the critical problems, fully develop the spirit of hammering the nail, persist with what you have started until you finish it, grasp the real problem, and then [make sure] you grasp it again. Do not leave behind hand-me-down problems, [and] truly make your work effective.⁵³⁵

JULY 2019: WIV NEEDS NEW SYSTEMS TO DISINFECT THE AIR AND MANAGE VIRUS SAMPLES

On July 18, the WIV issued its fourth notice of the year on the official procurement website of the PRC central government – this time for a project involving the acquisition of an “ambient air disinfection treatment system” and a “scalable automated [virus] sample storage management system.”⁵³⁶ The tender did not specify which of the two WIV campuses needed to purchase these two systems, but considering that most of the other tenders were focused on the Zhengdian campus that houses the BSL-4 laboratory, it was most likely intended for the Zhengdian campus. Two subsequent reports in November 2019 from the Zhengdian campus alluding to problems with the storage of virus samples further suggest this tender was meant for the Zhengdian campus.⁵³⁷ The contractor was chosen on August 14, and the winning bid for these two procurements was a substantial sum, roughly US\$1.27 million (RMB 8,566,800).⁵³⁸ This project may have been part of the facilities’ upgrade plan that the WIV discussed with senior CAS officials from Beijing on April 28.⁵³⁹

July 2019: WIV Signs Agreement to Work with Customs on Military World Games

On July 24, the WIV signed a “comprehensive cooperation agreement” with the Hubei International Travel Healthcare Center,⁵⁴⁰ which is the provincial office of the state-owned work unit that is directly run by the National Entry-Exit Inspection and Quarantine Bureau of the PRC General Administration of Customs.⁵⁴¹ The signing ceremony was witnessed by a senior official from the Wuhan Municipal Administration

of Customs (WMAC),⁵⁴² and appears to have been a follow up initiative from the larger “strategic cooperation agreement” that the WIV signed with the WMAC just one month earlier.⁵⁴³ The primary focus of the July agreement was on “ensuring biosafety and biosecurity [threat] detection during the period of the 2019 Wuhan Military World Games.”⁵⁴⁴ The report concluded by noting:

In accordance with the comprehensive cooperation agreement, the Wuhan Institute of Virology and the Hubei International Travel Health Center will focus on launching cooperation in areas [such as] detection of emerging virulent infectious diseases [found by] customs, establishing a customs biological samples database,...research on pathogens[,] and research and development of new technology to detect [pathogens] in order to jointly make contributions to our nation’s prevention and control of emerging virulent infectious diseases.⁵⁴⁵

JULY 2019: NHC HOLDS LARGEST PUBLIC HEALTH EMERGENCY DRILL SINCE SARS

On July 25, the PRC NHC held an infectious disease tabletop exercise in Yinchuan, the capital of Ningxia Hui Autonomous Region, which the CCP-run Beijing News described as “the largest nationwide emergency drill for a public health incident held since SARS.”⁵⁴⁶ The hybrid event, which participants joined both in person and virtually, drew more than 8,200 officials from all of the PRC’s 31 provincial level jurisdictions.⁵⁴⁷

The scenario of the tabletop exercise was set in 2020 and described by Xinhua as follows: “This exercise was a comprehensive prevention and control drill for the import of a sudden outbreak of infectious disease. The exercise adopted a tabletop model, the background for which was Ningxia discovered an imported X viral disease epidemic, and a certain province experiences partial community spread....”⁵⁴⁸ The officials ran through various drills on how to report information to the central government, how to do an epidemiological investigation, standards for collection and inspection, announcement of a confirmed epidemic, medical treatment for the ill, etc.⁵⁴⁹ It is not clear when planning began for this exercise, but Xinhua implied that it was held in response to the WHO’s declaration that the Ebola outbreak in the Congo was a “Public Health Emergency of International Concern,”⁵⁵⁰ which occurred on July 17.⁵⁵¹

JULY 2019: WIV STUDIES XI’S “BLACK SWANS” SPEECH, PRIORITIZES “URGENT PROBLEMS”

On July 25, the WIV held a plenary session to study Xi Jinping Thought, and Xiao Gengfu, the secretary general of the CCP committee at the WIV, used the occasion to reiterate remarks that Xi made in a widely publicized speech on January 21, 2019.⁵⁵² According to a report on the WIV website, Xiao emphasized: “[S]tate security is matter of paramount importance. In order to uphold state security in the key areas of politics, economics, and society, we must maintain a high level of vigilance from the beginning to the end. We must be highly vigilant about ‘black swan’ incidents and also guard against ‘gray rhino’ incidents.”⁵⁵³ Xiao stressed that the WIV should work on risk reduction: “We must enhance our ability to neutralize risks, going past appearances to look at the root, doing all we can do to neutralize risks at the source, [and] prevent the transmission, layering, evolution, and escalation of various risks....”⁵⁵⁴

Consistent with earlier reports in July, Xiao’s comments on this occasion suggested the prevalence of morale issues among WIV personnel. After conducting an inspection in which he held roundtable discussions, personal interviews with individual researchers, and received formal reports from lab managers, Xiao pointed out: “[T]he development of the P4 laboratory needs to place importance on a harmonious culture. We must strengthen organized coordination inside the laboratory...[and] go the next step to strengthen the sense of belonging among our institute’s personnel in order to make the P4 laboratory exert a greater effect in establishing the Center for Biosafety Mega-Science.”⁵⁵⁵

Wang Yanyi, the director of the WIV, also noted unspecified “urgent” problems facing the WIV and repeated Xiao’s theme from earlier in July that core responsibilities were not being taken seriously enough: “She pointed out that the content of this meeting was full and accurate, highlighted the key points, and classified them according to the principle of their relative importance or urgency. [We must] prioritize solving the urgent problems we are currently facing, and regarding the next phase of work, conduct deployments and make arrangements to ensure that responsibilities are fully implemented, and work measures are completed to promote the stable and sustainable development of the institute.”⁵⁵⁶

Tong Xiao, party secretary and deputy director of the BSL-4 lab, likewise delivered a report titled “Safe Operations and Coordinated Development of the P4 Laboratory,” in which he “focused on the ‘stranglehold’ problem [and] meeting the requirements of the

state, and conducted a deep analysis of the major problems currently existing in the P4 laboratory and major lines of thinking about how to solve them from the perspective of the hardware and technological aspects of the laboratory facilities, the management of biosafety, the institute's coordinated development, incentives and awards for personnel, etc.”⁵⁵⁷

AUGUST 2019: DIRECTOR OF WIV BSL-4 LAB SUBMITS PAPER ON RISKS OF SYNTHETIC BIOLOGY

On August 6, Yuan Zhiming, the director of the Wuhan National Biosafety Laboratory, submitted an article that he co-wrote with American virologist James Le Duc for publication in the September edition of the *Journal of Biosafety and Biosecurity*.⁵⁵⁸ Readers will recall a team led by Yuan published a piece in February in the same journal that called biocontainment labs a “double-edged sword,” and spoke in detail about biosafety regulatory gaps in China. Yuan drafted another piece on his own in May for publication in the September edition that acknowledged additional biosafety challenges such as training, funding, and proper maintenance and upkeep of equipment and facilities. This piece submitted in August with Le Duc focused specifically on the risks presented by the rapidly growing field of synthetic biology, particularly gene editing.

Here is a sample of key themes, as articulated by Yuan and Le Duc:

The rise of synthetic biology, employing novel techniques like gene editing, can create new biological pathways and even microbes not known to exist in nature.... One area of research that received considerable attention recently is gain of function studies, especially those investigations attempting to identify key molecular changes that might lead to efficient person-to-person transmission of avian influenza viruses.... Many countries are relying on regulations targeting Genetically Modified Organisms to regulate synthetic biology. As synthetic biology advances, these regulations may be insufficient to meet future oversight needs, given their focus only on known organisms.⁵⁵⁹

The authors highlighted the essential role of well-trained personnel: “Biosecurity in synthetic biology is largely dependent on the trusted workforce in the laboratory, and therefore a great deal of attention must be paid to a culture of safety, as well as careful personnel recruitment, background screenings, and adherence to strict policies and procedures regarding laboratory access.”⁵⁶⁰

As documented by this study, a series of reports in 2018 and 2019, both prior to Yuan's publication and in the months that followed it, collectively portray a picture of the WIV encountering political pressure to produce scientific breakthroughs while struggling with personnel recruitment, equipment and construction issues, and the development of a culture of safety, and as a consequence, biosafety incidents, including at least one of significance, appear to have occurred at the WIV in 2019.

AUGUST 2019: CAS AUTHORS RAISE THE SPECTER OF A LAB LEAK CAUSING A PANDEMIC

On August 16, Wang Xiaoli and Tang Hong, two scientists at the CAS Institut Pasteur of Shanghai, penned an article in the Study Times, a daily newspaper published by the CCP Central Party School, and the CAS posted the article on their official website.⁵⁶¹ The article was titled "Taking the Community of Common Destiny for Mankind⁵⁶² as the Vision, Planning for Scientific and Technological Innovation to Prevent and Control Infectious Diseases."⁵⁶³ After briefly surveying the outbreaks of Ebola, H1N1 influenza, MERS, and Zika, Wang and Tang asserted that "epidemics of major infectious disease are by no means distant,"⁵⁶⁴ and argued that "accelerating scientific and technological innovation to prevent and control infectious diseases is both imperative and urgent."⁵⁶⁵

In a section on the "complex causes of the outbreak of infectious disease,"⁵⁶⁶ Wang and Tang noted that nature was not the only conceivable culprit, and that science itself could cause an epidemic: "From the perspective of threats, the advancement of biotechnology has increased the danger that microorganisms could be misused or become potential pandemic pathogens. Viral pathogens that cause infectious disease can also be man-made or unintentionally leak from a laboratory accident, such as in 2017 when Canadian scientists successfully synthesized a smallpox-like horse pox virus."⁵⁶⁷

While the timing of Wang and Tang's article, in retrospect, was somewhat curious, its matter-of-fact recognition that a laboratory accident could produce a pandemic was not unusual. In pre-pandemic China, nothing was considered contentious about the proposition that accidents happen, and that accidents involving laboratories can have terrible consequences for public health. In fact, the PRC Ministry of Foreign Affairs' official submission to the BWC in 2011 contained just such a recognition: "Accidental mistakes in biotech laboratories can place mankind in great danger. Synthetic biology in some civilian biotechnology research and applications may unintentionally give rise to

new, highly hazardous man-made pathogens with unforeseeable consequences.”⁵⁶⁸ A group of six scientists at the CAS, one of whom worked at the WIV, also warned of this possibility in 2016, publishing a piece in the official Bulletin of the Chinese Academy of Sciences that raised the specter of a laboratory accident not once, but three times, and linked such risks specifically to experiments that manipulate naturally occurring viruses and bioengineer novel pathogens.⁵⁶⁹

The CAS authors categorized the following as biosafety risk factors: “the man-made synthesis of various biological agents (biological macromolecules like XNA, enzymes, synthetic organisms such as [chimeric] viruses, synthetic products of gene editing technologies such as CRISPR/Cas9 and reverse genetics, etc.); and the exploitation, misuse, and erroneous use of technologies that are conducive to the reproduction, dissemination, and proliferation of various biological agents; [as well as the escape of] hazardous materials from biosafety laboratories.”⁵⁷⁰ The authors continued:

The occurrence of various biological hazards has always been under certain adaptive conditions, [when] one or several biological agents break out in a concentrated manner as a result of their unique reproduction (replication) and transmission methods to cause harm to humans (animals and plants) and the environment. This includes...man-made [incidents], such as biotechnology development activities that lack management and control; the leakage of dangerous materials from high-level biosafety laboratories; the disorderly development and commercialization of biotechnology products; military applications; and terrorist incidents.⁵⁷¹

Finally, the CAS authors predicted biosafety risks would only grow in the coming years: “The difficulty of supervising and regulating the security of pathogens [stored in laboratories] will increase, [and] the risk of experiencing great damage caused by human activity at, or leaks from, high-level biosafety laboratories will be greater.”⁵⁷²

August 2019: Safety Drills Involving Infectious Disease Held at Airports in China

In keeping with State Customs Administration Director Zhang Jiwen’s remarks in March, and following the NHC tabletop exercise in July, local governments held several similar airport drills for infectious diseases in August.⁵⁷³ On August 14, the Shanghai Hongqiao

International Airport held a biosecurity drill in preparation for hosting the World Import Expo that took an Ebola outbreak as its hypothetical scenario.⁵⁷⁴

On August 19, the National Customs Administration held a public health emergency drill at Chongqing Jiangbei International Airport that focused on responding to a scenario in which a Chinese company in “a certain country” experiences “an explosive mass outbreak of disease of unknown origin.”⁵⁷⁵ Zhang Jiwen spoke at the drill, and said it was conducted specifically in response to Xi Jinping’s order to “firmly construct an epidemic inspection line of defense at our ports of entry.”⁵⁷⁶ According to the state-run Legal Daily, Zhang Jiwen claimed: “[T]he current global public health situation is very complex and grim. [When] preventing infectious diseases, especially the sudden outbreak of major emerging diseases that spread across borders, time is not on our side and [the matter] brooks no delay.”⁵⁷⁷

The official Xinhua News Agency cited an unnamed expert with dual appointments at the CCDCP and the PLA AMMS as having lauded the drill’s realism and echoed verbatim Zhang’s assessment that “the current global public health situation is complex and grim,” which made the Chongqing emergency drill “vitally important.”⁵⁷⁸ Neither Zhang nor the unnamed expert explained what developments or trends they had in mind that warranted their rather severe characterization of the threat landscape for global public health.⁵⁷⁹ As this report will document, two weeks after these comments were made, Xi Jinping would repeatedly invoke the phrase “complex and grim” to describe the threat landscape facing the CCP, and in November, officials sent from Beijing to the WIV would adopt the same phrase to talk about biosafety conditions at that time.

On August 20, the Xi’an Municipal Customs Administration and the Shaanxi Provincial Health Commission also drilled a scenario in which the State Customs Administration relayed a report from the WHO that a close contact of a patient “suspected of having a certain infectious disease” had boarded a flight en route to Xi’an Xianyang International Airport.⁵⁸⁰

August 2019: Leading Biosafety Expert Calls for Urgent Attention to Regulatory Gaps

On August 20, Wu Guizhen, the leading biosafety expert at the CCDCP, submitted an article for publication in the English language journal *Biosafety and Health*. The article, titled “Laboratory Biosafety in China: Past, Present, and Future,” was published online

on October 31.⁵⁸¹ Wu's article acknowledged a series of risks and shortcomings in China's biosafety practices, which echoed those discussed by WIV researchers when U.S. diplomats visited the WIV in 2018 as well as the concerns outlined by Yuan Zhiming, George Gao, and others in publications from 2019 reviewed during this study.

Wu Guizhen emphasized that were regulatory gaps in need of immediate attention. She said there was a "pressing need to improve the regulatory standards system," particularly calling for better coordination to "propose necessary and prompt revisions of regulatory measures for biosafety, providing support and guidance for the development of synthetic biology, gene editing, and biological resource preservation and utilization." Wu noted that regulation of BSL-2 laboratories in China was "lacking," and concluded "more biosafety laws are urgently needed."⁵⁸² As noted above, the NPC first turned to drafting a biosecurity law in March 2019 and held a roundtable among drafters in July. As will be detailed later in this chronology, the bill passed out of committee in September, and the first reading of the bill by the full NPC Standing Committee was conducted in October.

AUGUST 2019: WIV LEADERS DISCUSS "RECTIFICATION AND REFORM" OF "CRITICAL PROBLEMS"

On August 23, Xiao Gengfu, the secretary general of the CCP committee at the WIV, called a meeting of party officials, party members, and mid-level management at the WIV, in which he delivered a report titled "Identifying the Disparities, Stressing Implementation, [and] Diligently Pioneering Biosafety Technological Innovation."⁵⁸³ Xiao's report focused on, among other things, "critical problems impacting the development of the research institute and hot topics of concern among personnel."⁵⁸⁴ An inspection conducted by Xiao produced a "detailed list of problems" consisting of "a total of 20 problems and five aspects" in which the WIV's work had fallen short.⁵⁸⁵

The WIV report did not describe what those 20 problems consisted of, but the following comments suggested some degree of severity:

Regarding those problems that could be immediately corrected as soon as they were identified, we earnestly launched specialized rectification, clarified the division of duties, applied pressure to implement responsibilities [at all levels], and held the institute's leadership and related departments accountable for completing their assigned responsibilities before the deadline. For problems that

need sustained rectification, [we must] place importance on top-level design, specifying [responsibilities] at every level...by means of precise organization, making careful arrangements [and] concerted efforts, [and] in the spirit of hammering the nail, [we must] accelerate [efforts] to push forward with various specialized rectification projects, ensuring that the reform is complete and thorough.⁵⁸⁶

Xiao concluded by emphasizing: “[T]his...has been a baptism in political ideology, and also a ‘comprehensive testing experience’ for the institute. By going through the implementation of sustained rectification of critical problems that are restricting the institute’s development, we firmly believe that the Wuhan Institute of Virology has the confidence [and] the capability to succeed at establishing a high-level biosafety laboratory and to safeguard and manage [our] work.”⁵⁸⁷

On August 28, two more political meetings were held at the WIV. The first meeting was presided over by a visiting CCP official from the CAS named Wang Daguo.⁵⁸⁸ Much of this meeting also focused on addressing problems at the WIV. For example, leading CCP cadres at the WIV were described as having “checked themselves against the party constitution and party regulations, and from the five angles of ideology, politics, work style, capabilities, and clean governance, and in a manner of frank and honest discussion, searched for inadequacies, analyzed the problems, launched criticisms and self-criticisms, proposed rectification measures, [and] truly achieved the effect of making everyone red-faced and sweating [while] enhancing unity.”⁵⁸⁹ In the second meeting held on August 28, Xiao Gengfu told the WIV leadership that they must prioritize “strengthening top-level design, and resolving the important problems that are restricting the development of the institute.”⁵⁹⁰

AUGUST 2019: EXPERT CLAIMS “IMPORTANT ADVANCEMENT” IN CORONAVIRUS RESEARCH

On August 31 and September 1, a conference was held in Beijing in which a progress report was delivered to the MOST regarding a state key R&D project to study major zoonotic diseases that cross the species barrier to infect humans, according to a report on the website of the CCDCP.⁵⁹¹ The conference was attended by more than 50 participants from a total of 17 different organizations, including universities, government ministries, and state-run laboratories like the CAS. The principal

investigator, Tan Wenjie, presented preliminary findings for the project, which was scheduled to conclude in 2020.⁵⁹²

Tan Wenjie is the director of the Viral Disease Emergency Response Center of the National Institute for Viral Disease Control and Prevention at the CCDCP, but he also holds concurrent appointments at the WIV's Center for Biosafety Mega-Science and the Central Theater People's Liberation Army General Hospital in Wuhan.⁵⁹³ Tan reportedly spoke of "the project team's important advancements, work highlights, and output of achievements since the launch of the project to study cross-species infection and transmission of important zoonotic pathogens such as coronaviruses, West Nile virus, and Chikungunya virus."⁵⁹⁴ The report did not describe what those "important advancements" were as they pertained to coronaviruses or at what laboratory they were made.

SEPTEMBER 2019: CAS POSTS ARTICLE ON THE IMPORTANCE OF "SAFE PRODUCTION"

On September 3, the CAS, the parent organization of the WIV, posted a report on its website titled "Safe Production has No 'Inspection-Exempted Work Units,' Much Less 'No Worries Work Units.'"⁵⁹⁵ The report stressed the importance of "safe production" – the theme of the WIV's annual conference on safety and security held in April – and urged vigilance against complacency.⁵⁹⁶ It described an industrial fire that occurred in Henan Province on July 19 that resulted from an explosion after a leak that was discovered on June 26 went unaddressed. 15 people perished in the fire and 16 others were injured. The report highlighted the fact that the facility where the accident occurred had won an award for safe production from the provincial government earlier the same year.⁵⁹⁷

"Controlling safety [conditions] is not a matter that can be settled once and for all. If you temporarily ignore some jobs, it won't necessarily cause a major issue, but safety allows no rest, not even for a moment. You must give more than 100 percent of your attention and care to it, every day control it, and every moment control it,"⁵⁹⁸ the report admonished, "As soon as you relax safety [measures], [you are] extremely likely to 'set a fire to yourself,' and burn yourself to the point that it makes people grieve and lament, when it is too late for regrets."⁵⁹⁹

The closing paragraph urged those responsible for safety inspections:

To be a good supervisory and regulatory department, you must bring the “no worries work units” into your supervisory and regulatory line of sight, and you certainly cannot let “one handsome [man] conceal a hundred ugly ones,” only seeing the “bright spots” while ignoring the “shortcomings.” Just because it is a “model enterprise,” you cannot “relax your grip” and “cut them some slack.” This will cause the enterprise to lose external constraints and supervision, and before you know it, management is relaxed, the requirements for standardized operations are relaxed, and they will even deliberately conceal their problems, the problems will accumulate and multiply, getting more severe as they accumulate until it leads to consequences that are difficult to remedy.⁶⁰⁰

While this report drew examples of safety incidents from industry, the fact that the CAS posted the report on its website reinforces the concerns expressed at the WIV in April that similar problems of safety laxity were evident at the WIV.

SEPTEMBER 2019: XI GIVES POLITICAL “STRUGGLE” SPEECH TO CENTRAL PARTY SCHOOL

On September 3, Xi Jinping gave an important speech to young cadres gathered at the Central Party School that was replete with unusually strong admonitions, such as, “[L]eading cadres must take the initiative to throw themselves into the middle of various struggles, when confronted by major matters of right and wrong, they must dare to brandish the sword, when confronted by contradictions and conflicts, they must dare to meet the difficulties head on, they must step forward bravely when facing crisis and hardship, and they must dare to resolutely struggle when faced with evil winds and noxious influences.”⁶⁰¹ Xi repeatedly stressed the importance of political “struggle” (56 times in the redacted Xinhua account of the speech) – a concept closely associated with the tumultuous era of the Cultural Revolution (1966-76) – and hailed it as the central key to the CCP’s political success.⁶⁰²

Notably, Xi repeatedly warned of unspecified difficulties that lay ahead, as if some battle were on the horizon just beyond their field of vision. According to the official Xinhua News Agency:

Xi Jinping emphasized that struggle is an art, and we must be good at struggle. In all kinds of major struggles, we must insist on enhancing our sense of unexpected hardship and maintaining the unity of strategic determination, the unity of

strategic judgment, the unity of military tactical decisiveness, and the unity of the process of struggle with the actual results of the struggle. Leading cadres are duty-bound to defend the country and must discharge these responsibilities [to defend the country] faithfully, coming as soon as you are called, proving you can fight after you arrive, and prevailing without fail when you fight.⁶⁰³

Xi told the young cadres that everything was at stake in the upcoming struggles, including the “great rejuvenation” that the CCP’s claims as its *raison d’être*: “Xi Jinping emphasized that the great rejuvenation of the Chinese nation cannot be achieved easily by beating gongs and drums. A great struggle must be waged to realize a great dream.”⁶⁰⁴ He continued to warn of dangers to come that seems strangely prescient: “As we move along the path forward, the risks and tests we face will only become more and more complex, and we will even encounter terrifying waves that are difficult to imagine. The various struggles that we face are not short-term but long-term, and they will accompany us at least throughout the process of achieving the second centenary goal. We must...fortify the will to fight. When a grave situation and the duties of struggle appear in front of us, we must have moral character, dare to attack, and dare to fight to win.”⁶⁰⁵

Xi continued to develop this theme of dangerously complex and grave situations, adding: “[L]eading cadres must receive strict ideological tempering through severe trials and political tempering through experience and practical training. In the middle of complex and grave struggles, you will go through the wind and the rain, broaden your horizons, strengthen your muscles and bones, and truly be forged to the point that pure gold proves its worth in a blazing fire.”⁶⁰⁶ He later added: “We must persist with steeling ourselves through major struggles. The more difficult and contradictory the place [we find ourselves], the graver and more complicated the situation, the more we can exercise courage, sharpen our will, and grow our talents.”⁶⁰⁷ As readers will soon learn, Xi’s repeated warnings of a “grave and complex situation” would reemerge in the rhetoric of an official sent from Beijing to Wuhan to admonish the WIV for problems with its “safety work” in November 2019.

SEPTEMBER 2019: **WUHAN GOVERNMENT** ISSUES HEALTHCARE DIRECTIVE

On September 5, the General Office of the Wuhan Municipal People’s Government drafted a public health preparedness memo titled “Notice Regarding the Issuance of the Implementation Plan for Reforming and Improving the Comprehensive Supervision

System of the Medical and Health Industries in Wuhan.”⁶⁰⁸ The directive was released to relevant government departments on September 17, but the text was not disclosed to the public until April 21, 2020.⁶⁰⁹ The directive represented Wuhan’s local implementation of State Council guidelines that were issued at the national level in August 2018.⁶¹⁰

While the impetus for this initiative clearly came from Beijing, the timing of its implementation in Wuhan may be significant, and perhaps was in response to relevant local events. Hubei Province, to which Wuhan is subordinate, issued its directive nine months earlier in December 2018.⁶¹¹ Other large municipalities, such as Beijing and Shanghai, did not release their directives until 2020.⁶¹² It is not clear what factors, if any, determined the September release of Wuhan’s directive, but the release did appear to coincide roughly with other official actions and events at the WIV and elsewhere in Wuhan, such as those taken at the airport, which were geared toward responding to an outbreak of infectious disease.

In the first section of the directive, titled “Primary Tasks and the Division of Responsibilities,”⁶¹³ the chief point of emphasis is “persisting with and strengthening the comprehensive leadership of the party.”⁶¹⁴ The directive specifically ordered officials:

[S]trengthen the party’s leadership of public hospitals,...implement the responsibility system for hospital directors under the leadership of the party committee,...strengthen the three-level party organizational framework of ‘hospital party committee – general party branch – party branch,’ and...insist on the organic fusion of party organizational activities with the professional work [of the hospital],...push forward with innovative activities, and be innovative with the content and vehicle for delivering political ideology work.⁶¹⁵

The directive also called for “party building” in private hospitals and for those party organizations to “join hands” with the party committees in public hospitals.⁶¹⁶

While the directive was wide-ranging in its content, including sections on topics from quality control measures to reducing the cost of medical services, its dominant concern, as detailed above, was “deepening the supervision and regulation of public health services” by the party-state.⁶¹⁷ In one section that bore that title, attention was drawn specifically to regulating laboratory safety and monitoring for the outbreak of infectious

disease in a list of priority areas: “[S]trengthen supervision and regulation of public health services in accordance with the law, [including]...the prevention and treatment of infectious diseases, [and] biosafety at laboratories....”⁶¹⁸ It called for measures to ensure infectious diseases were being reported to the authorities: “[S]trengthen monitoring and inspection of...the standardized reporting of major infectious diseases, standardized treatment, and follow-up management.”⁶¹⁹ It also required preparations for sudden outbreaks: “[S]trengthen on-the-spot investigations of the development of capabilities and quality of public health services in public health departments in public hospitals, ensuring the completion of public health services [related to] handling sudden incidents [and] the response to public health emergencies, urgent medical rescue [operations], and other duties.”⁶²⁰

SEPTEMBER 2019: WIV MANAGEMENT PERSONNEL CONTINUE TO FACE INTERNAL CRITICISM

On September 6, He Changcai, the deputy secretary general of the CCP committee at the WIV, reiterated comments that he made in July criticizing mid-level managers at the WIV. He once again suggested that WIV managers were not sufficiently thorough in their work: “Management personnel are confronted with various and sundry work. You must maintain patience, excel at applying scientific thinking, orient yourselves towards the problems, take the initiative to think through [various] ways and methods to solve the problems, [and] you must have the work spirit of persisting with what you have started until you finish it in order to be effective in your jobs.”⁶²¹

September 2019: CCP Launches Political Inspection of the WIV’s Parent Organization

On September 11, the CCP Central Committee dispatched the No. 15 Inspection Patrol Group to the Beijing headquarters of the CAS, with a mandate to conduct a political inspection of its leadership.⁶²² The inspection of the CAS was scheduled to last for approximately two months, and as explained by Su Bo, the inspection group leader, “[I]nspections are political supervision, [and] a comprehensive and personal political examination of the performance of political responsibilities, duties, and missions by party organizations [under the] Central Committee and state organs.”⁶²³ The areas of focus were described as “violations of political discipline, party organizational discipline, [financial] ethics discipline, discipline with regard to the masses, work discipline, and

discipline in one's personal life...,⁶²⁴ and the loyalty of the CAS to Xi Jinping was a persistent theme.

Su Bo stressed that the inspection would “take the ‘Two Upholds’ as its fundamental obligation,” and “search deeply for political deviation.”⁶²⁵ The “Two Upholds”⁶²⁶ is a political doctrine that maintains that the primary duty of all CCP cadres is to “resolutely uphold Comrade Xi Jinping’s core position on the Central Committee, and in the Party as a whole, and resolutely uphold the Central Committee’s authority and its centralized, unified leadership,” the purpose of which, some sources add, is “to ensure that all Party members act in unison.”⁶²⁷

An indicator of the importance that the CCP leadership placed on the CAS inspection can be seen in the fact that the CCP Leading Group that oversees the No. 15 Inspection Patrol Group presented its findings to a meeting of the CCP’s most senior decision-making body, its Politburo Standing Committee.⁶²⁸ A general summary of the findings posted on the website of the CCP Central Discipline Inspection Commission articulated 15 “principal problems” that were discovered during the inspection, a sample of which included: 1) a “persistent gap” between Xi Jinping’s important instructions on pursuing “leap frog development in science and technology” and the CAS’s implementation of Xi’s instructions, 2) “unsatisfactory [efforts] to implement the strengthening of the Party’s comprehensive leadership demands,” 3) “weak links in the work to manage and supervise [CAS] scholars,” 4) “the continued existence of formalistic and bureaucratic ways of doing things, and violations of the spirit of the Central Committee’s 8-Point Decision on Improving Party and Government Conduct,” and 5) “insufficient insistence on political standards in making personnel decisions.”⁶²⁹

Other comments in the report clearly indicated a desire to strengthen political control over CAS academic personnel. Su Bo admonished the CAS to “put into practice the ‘Two Upholds’ through real action,” and to “take further steps to manage and supervise personnel decisions with regards to scholars.”⁶³⁰ While it is unclear if the two events were related, the WIV held a political meeting attended by more than 50 of its personnel and management on September 3, eight days before the political inspection of the CAS began. The WIV meeting was convened to discuss the beginning of internal audits and to “warn” personnel about violations of CCP political discipline. The report indicated that those in attendance studied nine cases of CAS personnel at the department head

level or lower who had violated various aspects of the CCP Central Committee's Eight-Point Decision on Improving Party and Government Conduct since the late 2017.⁶³¹

Although Xi Jinping has demonstrated a much greater propensity for launching political investigations than his recent predecessors, there is also a history of tensions between the CCP and the CAS, with the former harboring ideological distrust of the latter.⁶³² It took the CAS many years to recover from the disruption and damage of the Cultural Revolution from 1966 to 1976.⁶³³ In this particular instance, however, the inspection of CAS leadership occurred as a part of a larger political campaign by the CCP Central Committee to inspect a total of 37 CCP and state-run organizations (of which the CAS was one) for their loyalty to Xi Jinping.⁶³⁴

SEPTEMBER 2019: WIV TAKES DOWN ONLINE DATABASE OF VIRUSES

September saw a reduction in transparency at the WIV, a diminishment in its collaboration with scientists outside of China, and an enhancement in its physical security posture. On September 12, apparently between the hours of 2:00 and 3:00 AM local time,⁶³⁵ the WIV took down its online depository of data on viral sequences called the Wildlife-Borne Viral Pathogen Database.⁶³⁶ This database was previously accessible to researchers inside and outside of China, with the exception of a password protection section, which held unpublished sequence data accessible only to WIV personnel.⁶³⁷ Records indicate an initial period of inactivity with the database between August 16-22, 2019, with a period of normal accessibility and activity restored from August 23 to September 12, when the database was taken offline for a prolonged period of time.⁶³⁸ At the time of publication of this report more than three years after it was first disabled, public access has not been restored.⁶³⁹

It does appear that the database was briefly accessible, but only intermittently, from December 2019 to February 2020.⁶⁴⁰ Late January and early February 2020 is when claims began to circulate on the Chinese internet alleging that the WIV was the origin of SARS-COV-2 outbreak.⁶⁴¹ The database has been completely inaccessible since those claims began circulating. The database reportedly contained more than 2,000 entries consisting of sample and pathogen data, including full and partial genomic sequences, collected from bats and mice. The WIV had reportedly collected more than 15,000 samples from bats, from which they had identified over 1,400 bat viruses.⁶⁴² The disabled database reportedly held an estimated 100 unpublished sequences of beta-

coronaviruses taken from bats – the genre of coronaviruses to which SARS-CoV-2 belongs – which has led some experts to speculate that the disabled database “holds essential information on SARS-CoV-2 origins.”⁶⁴³

Shi Zhengli, director of the WIV Research Center for Emerging Infectious Diseases and the CAS Key Laboratory of Special Pathogens as well as deputy director of the Wuhan National Biosafety Laboratory, was the administrator of the database.⁶⁴⁴ Public statements concerning the reason for disabling public access to the database and descriptions of the contents of the database made by Shi and her international collaborator Peter Daszak of the EcoHealth Alliance have raised more questions than answers. In December 2020, the BBC reported that Shi had told them that “the WIV’s website and the staff’s work emails and personal emails had been attacked, and the database taken offline for security reasons.”⁶⁴⁵

In an email dated 26 January 2021 and addressed to Mr. Tommy Cleary, Shi Zhengli wrote: “During COVID-19 pandemic, our Institute web server has been fiercely attacked (still going on sometime) and our Institute decided to close down some web pages and databases including our bat virus database. I’ve no idea when it will be open.”⁶⁴⁶ The DRASTIC Research Group has noted that “either the reason given for taking the database off is not correct...or the statement points at an outbreak in Sep 2019.”⁶⁴⁷ On March 10, 2021, Peter Daszak told Chatham House in an interview that the database had been taken down due to “about 3,000 hacking attempts,” as conveyed to him by Shi Zhengli. Daszak added that taking down the database was an “absolutely reasonable” response, and that the WHO team “did not ask to see the database” during its visit to Wuhan in January and February 2021. Daszak suggested such access was unnecessary because “we [EcoHealth Alliance] do basically know what’s in those databases.”⁶⁴⁸

Shi Zhengli further claimed in her email to Tommy Cleary that all genomic sequences of viral samples contained in the database had been published, but that claim contradicts a description of the database previously displayed on the WIV website that acknowledged the existence of a password protected section of the database where unpublished sequences were stored.⁶⁴⁹ Another indicator of the potential scope of viral sequences that the WIV possessed, but had not published, can be gleaned from the 2014 grants from the NIH to the EcoHealth Alliance published by the Intercept in September 2021.⁶⁵⁰

The grant renewal proposal R01 states that the WIV would be processing around 1,000 samples per year of bat SARS-like coronaviruses thought to pose a risk to humans.⁶⁵¹

SEPTEMBER 2019: WIV STRENGTHENS PHYSICAL SECURITY, SEEKS RENOVATION OF A/C SYSTEM

On September 12, the same day that the WIV took the Wildlife-Borne Viral Pathogen Database offline in the early morning hours, the WIV issued a notice on the official procurement website for the PRC central government seeking bids from contractors to provide unspecified physical “security services” for its facilities at the Zhengdian Park campus where the new BSL-4 lab is located.⁶⁵² Four days later, on September 16, the WIV issued another notice on the official procurement website for the PRC central government seeking contractors to bid for a “central air conditioning renovation project” at the Zhengdian Park campus.⁶⁵³ The project was expected to take almost seven months (210 calendar days) to complete, and a budget of up to approximately US\$586,709 (RMB 3,926,876.94) was allotted to pay for the renovation.⁶⁵⁴ It is unclear why modern laboratory facilities like those located at the WIV’s Zhengdian Park would require expensive renovations on a major system such as the HVAC unit so soon after they commenced operations.

SEPTEMBER 2019: WIV ADVISES WUHAN AIRPORT DRILL RESPONDING TO “NOVEL CORONAVIRUS”

On September 18, the Wuhan Municipal Customs Administration and other officials held two “emergency response drill activities” at the Wuhan Tianhe International Airport in preparation for Wuhan’s hosting of the Military World Games in October. One exercise involved the discovery of high-level radiation in a piece of luggage, and the second focused on responding to the outbreak of a novel coronavirus at the airport.⁶⁵⁵ The PRC state-run media described the scenario as follows: “[T]he drill simulated in real combat style...the whole process of handling the discovery of one case of a novel coronavirus infection at the airport customs lane.... [W]e drilled an epidemiological investigation, medical examination, real-time set up of a quarantine area, isolation and testing, the transfer of cases [to hospitals], hygiene management, and other stages [in the process].”⁶⁵⁶

Another local media report contained details about the drills that were not included in the Hebei Daily report that Xinhua reprinted at the national level. For example, one

salient fact that appeared in local reporting, but not in the Hebei Daily article that Xinhua reprinted, was that the airport worked with the WIV and the Hubei Provincial Health Commission to design and conduct the drill. A September 18 report from Chutian Transportation Broadcasting quoted Li Zhenhan, deputy director of the Wuhan Airport Customs Administration, as having stated that the drills involved “strengthening cooperation with the provincial health commission and the Wuhan Institute of Virology of the Chinese Academy of Sciences to establish cooperative mechanisms for epidemic notification, case transfer, and research of major infectious diseases.”⁶⁵⁷

The WIV’s involvement raises the possibility that it was WIV experts who suggested drilling an outbreak of a novel coronavirus. The WIV’s involvement is also consistent with a report that the WIV signed a “strategic cooperation agreement” with the Wuhan Municipal Customs Administration in June 2019, in which “the two parties would launch extensive scientific and technological cooperation in [the areas of] risk analysis and early warning prediction of sudden, emerging infectious diseases, the research, development, and application of technology to detect highly pathogenic pathogens, the training and exchange of biosafety personnel, and the sharing of pathogen resource data....”⁶⁵⁸ There is no public record that the September drills occurred on the official website of the Wuhan Tianhe International Airport. Some online media reports of the drills appear to have been removed, while others remain accessible.

Staff was able to locate only one other incident of a similar drill being held at the Wuhan Tianhe International Airport through public reporting. It was held in November 2014, and Ebola was the scenario in question.⁶⁵⁹ That drill was likely prompted by the Ebola outbreak in West Africa reported by the WHO in March 2014.⁶⁶⁰ While other airports in China have held safety drills in advance of their cities’ hosting of major international events, it appears that only Wuhan had specifically drilled for a “novel coronavirus” as a scenario for which to prepare.⁶⁶¹ Notably the safety drills performed in Beijing before the 2008 Olympics, and in Shanghai before the 2010 World Expo, did not focus on a potential coronavirus outbreak, even though the SARS crisis of 2003-2004 was still a recent memory.⁶⁶² Two analysts at a consultancy with an extensive network of contacts in China, writing in April 2020, suggested they had “reason to suspect that the emergency ‘coronavirus disposal’ drills at the Wuhan Tianhe International Airport in September 2019 could have involved an actual spillage of coronavirus that was reported as a ‘drill.’”⁶⁶³

SEPTEMBER 2019: GEORGE GAO WARNS OF RISK OF A "LETHAL RESPIRATORY PATHOGEN"

On September 18, the Global Preparedness Monitoring Board (GPMB), which is co-conveyed by the WHO and the World Bank, forewarned in their first-ever World at Risk Report of the growing risk of "a rapidly spreading pandemic due to a lethal respiratory pathogen."⁶⁶⁴ The report considered scenarios whereby such a pandemic could occur as the result of an accidental laboratory escape or intentional release, and called for the United Nations to conduct two high-level simulations over the following year (2020), one focused on a pandemic caused by a natural zoonotic spillover and another caused by a lethal respiratory pathogen that was engineered in a laboratory and deliberately released.⁶⁶⁵ Dr. George Fu Gao, the director-general of CCDCP, is one of 12 members of the GPMB Board of Directors that oversaw the production of this report.⁶⁶⁶ Gao published an article in March 2019 that warned how the genetic modification of pathogens could create new risks for epidemics by expanding their host range and increasing their transmissibility and virulence.⁶⁶⁷

In a September 10 report that was prepared by the Johns Hopkins Center for Health Security for GPMB to reference as background material when drafting the World at Risk Report, the team of scholars noted the potential for a biosafety incident at a laboratory to precipitate a pandemic: "Laboratory-acquired infections (LAIs) occur from occupational exposures to pathogens to those working in a laboratory. LAIs not only affect the health of the individual researcher but also pose a risk to the broader public health, as LAIs are a mechanism for accidental release of pathogens into the environment.... And it would be of potentially extraordinary consequence, even pandemic consequence, if a lab infection with a high-impact respiratory pathogen led to human spread outside the laboratory."⁶⁶⁸

SEPTEMBER 2019: BIOSECURITY BILL PASSED OUT OF COMMITTEE

On September 19, the Environment Protection and Resources Conservation Committee of the NPC reviewed and passed the biosecurity bill that the NPC began drafting in July in response to Xi Jinping's instructions.⁶⁶⁹ Its swift passage out of the committee of jurisdiction in September paved the way for the first reading by the NPC Standing Committee in October.

SEPTEMBER 2019: PCR TESTS PURCHASED, SUSPECTED COVID-19 PATIENT HOSPITALIZED

On September 21, the Hongshan District CDCP in Wuhan Municipality made two purchases of pathogen detection equipment and cited Wuhan's hosting of the upcoming Military World Games (October 18-27) as the justification for the purchases.⁶⁷⁰ Overall spending on PCR equipment in Hubei Province, for which Wuhan is the capital, jumped from 36.7 million RMB in 2018 to 67.36 million RMB in 2019.⁶⁷¹

There may be significance to the fact that the uptick of purchases of PCR testing equipment in Hubei Province in the fall of 2019 began in Wuhan's Hongshan district. Yu Chuanhua, professor of biostatistics at Wuhan University, gave an interview in February 2020 in which he discussed his work to compile a nationwide database of COVID-19 cases, both confirmed and suspected, which had 47,000 cases by late February 2020.⁶⁷² Yu noted several cases that predated those in December that the PRC authorities claimed were the earliest cases. "For example, there is data on a patient who became ill on September 29," he said. "The data shows the patient has not undergone nucleic testing, the clinical diagnosis (CT scan diagnosis) is a suspected case. The patient has already died. The data did not have a diagnosis [or] the date and time of death, it could also be incorrect data."⁶⁷³

The 61-year-old patient admitted on September 29 was identified by the surname "Su." Patient Su was treated at the Hubei Provincial Rongjun Hospital⁶⁷⁴ in Hongshan District, and some of her personal data that was reportedly disclosed to a Chinese medical journal revealed details about the patient's place of residence, indicating she likely lived in the Kaile Guiyan community on Zhuodaoquan Street, which is also located in Hongshan District, about 600 meters from the state-run hospital where she was treated.⁶⁷⁵ Professor Yu reportedly called the reporter two days after the interview to retract his statements, which may reflect pressure from PRC authorities to suppress the information that Yu disclosed.⁶⁷⁶

SEPTEMBER 2019: NATIONAL HEALTH SYSTEM HOLDS VIDEO CONFERENCE ON BIOSECURITY WORK

On September 26, the NHC held a "National Health System Video Conference on Biosecurity and Fire Prevention Work"⁶⁷⁷ for local governments to receive instructions on work to be done in advance of the period of the PRC National Day on October 1, which in 2019 was particularly significant because it marked the 70th anniversary of the founding of the PRC.⁶⁷⁸ The briefers called on local officials to "elevate the importance

of politics” and “shoulder the heavy responsibilities for safe production.”⁶⁷⁹ They were told to “deepen one-by-one inspections and rectification of hidden dangers,” and “organize and launch a security inspection that carpets the whole area in a single sweep, with full coverage, leaving no stones unturned....”⁶⁸⁰ Officials were expected to work overtime shifts and ensure 24-hour coverage to “do a good job with sending information reports on sudden incidents and significant incidents, ensuring the quality of the ‘first report,’ promptly reporting the incidents’ important information, and race against time to bring concentrated force to bear in solving the problem.”⁶⁸¹

SEPTEMBER/OCTOBER 2019: SPIKE IN HOSPITAL TRAFFIC, ANECDOTAL ACCOUNTS SUGGEST OUTBREAK UNDERWAY

A team of scientists led by a Harvard Medical School professor in June 2020 suggested that the novel coronavirus may have begun spreading in Wuhan as early as August 2019 based on the unusual increase in hospital traffic observed during September and October 2019.⁶⁸² The team made this inference on the basis of a couple of indicators, the most significant of which was their analysis of satellite imagery of vehicular traffic at hospitals in Wuhan. The satellite data showed a significant increase in vehicles parked at major Wuhan hospitals – an indicator previously established as a proxy for hospital occupancy rates – during the fall of 2019 compared to the same period of time in 2018. The pronounced increase in parked cars was observed at five of the six hospitals that were examined, as much as a 90 percent rise in some cases.⁶⁸³

Diplomats stationed at the U.S. Consulate General in Wuhan also attested to anecdotal observation of what they believed at the time to be a bad flu season. The Deputy Consular Chief writing in April 2020 recalled: “By mid-October 2019, the dedicated team at the U.S. Consulate General in Wuhan knew that the city had been struck by what was thought to be an unusually vicious flu season. The disease worsened in November.”⁶⁸⁴ An international student pursuing a Ph.D. at Wuhan University in 2019 told the Korean media outlet Arirang News in 2020 that he and others in Wuhan had become aware of an “outbreak of pneumonia” in September 2019, which was initially dismissed as an ordinary seasonal illness, but by November, the severity of the outbreak had increased to the point that public awareness was growing that something unusual was spreading.⁶⁸⁵

OCTOBER 2019: WUHAN UNIVERSITY WARNS ITS LABS ABOUT SAFETY

On October 14, the Laboratory and Equipment Management Office of Wuhan University circulated a notice to the university's laboratories calling for them to take steps to maintain lab safety during the period in which Wuhan was hosting the Military World Games (October 18-27). The notice required labs to carry out a "comprehensive investigation" aimed at the "elimination of hidden dangers."⁶⁸⁶ Another lab inspection report from Wuhan University in 2019 identified significant problems with safety conditions, including student adherence to safety protocols, storage of biochemical agents, and waste disposal.⁶⁸⁷ The WIV was birthed as a department of Wuhan University in the 1930s, and it remained a part of the university until it was absorbed by the CAS in 1956.⁶⁸⁸ The offices of the Wuhan branch of the CAS and the WIV's main research campus in Wuchang District are both adjacent to the sprawling campus of Wuhan University.

OCTOBER 2019: GEORGE GAO ATTENDS "EVENT 201" ON PANDEMIC RESPONSE

On October 18, the Johns Hopkins Center for Health Security, the World Economic Forum, and the Bill and Melinda Gates Foundation jointly assembled a group of 15 distinguished leaders from global business, government, and public health for a tabletop exercise in New York City.⁶⁸⁹ The group spent three-and-a-half hours role playing a team of high-level decision makers who had to recommend actions to mitigate the large-scale economic and societal consequences of "an outbreak of a novel zoonotic coronavirus transmitted from bats to pigs to people that eventually becomes efficiently transmissible from person to person, leading to a severe pandemic." The exercise featured a "pathogen and the disease it causes...modeled largely on SARS, but...more transmissible in the community setting by people with mild symptoms."⁶⁹⁰ George Fu Gao, director-general of the CCDCP, was one of the 15 participants,⁶⁹¹ and one of two who also served on the GPMB,⁶⁹² which issued a similar warning detailed above in its World at Risk Report on September 18.

OCTOBER 2019: WUHAN HOSTS MILITARY WORLD GAMES, ATHLETES REPORT ILLNESS

More than 9,000 international athletes representing over 109 countries traveled to Wuhan for the Military World Games that began on October 18 and concluded on October 27.⁶⁹³ Many of them, including athletes from France, Italy, Germany, Luxembourg, and Canada, reported that they became ill while in Wuhan, or shortly after returning to their home countries, with symptoms consistent with COVID-19.⁶⁹⁴ Eleven

Iranian athletes reportedly died of COVID-19, including some who participated in the Military World Games.⁶⁹⁵ One study used a mathematical model to assess whether cases of illness reported by athletes returning from Wuhan had any bearing on subsequent outbreaks and concluded: “There is a correlation between the number of individuals who travelled to the event and the number of COVID-19 cases in the country to which they returned.”⁶⁹⁶

OCTOBER 2019: FIRST READING OF DRAFT BIOSECURITY BILL, LAB LEAK IDENTIFIED AS A THREAT

On October 21, the NPC Standing Committee, led by Politburo Standing Committee Member Li Zhanshu, formally reviewed the draft law on biosecurity, which the NPC started drafting in July and passed out of committee on September 19.⁶⁹⁷ Preventing and prohibiting the use of biological agents and biotechnology to harm state security was described by the NPC leadership as the “main point” of the legislation.⁶⁹⁸ During the first reading of the bill, Gao Hucheng, the chairman of the NPC Environmental Protection and Resources Conservation Committee, delivered the official explanatory report to the NPC Standing Committee, articulating the purpose of the legislation and summarizing its key points. Xinhua published a photo of Gao delivering the report on the day that the first reading occurred, but the text of the report was not published until almost a year later on October 19, 2020, following the bill’s final passage. The NPC, not Xinhua, published the full text of Gao’s report, which means distribution was in effect limited to only those who regularly peruse the NPC’s website.

Xinhua published a contemporaneous report on the first reading titled “Draft Biosecurity Law Creates Penalties for Misuse of Biotechnology and Other [Mis]Conduct,” which summarized the legislation as follows: “Addressing the problem that our country’s laws lack penalties and regulations to address incidents of the misuse of biotechnology and other misconduct that have recently occurred, the draft clarified corresponding responsibilities and penalties, filling in a gap in the law.”⁶⁹⁹ Xinhua added:

The eight areas in which the scope of the draft was refined and modified were: 1) control and prevention of major sudden emerging infectious diseases, animal and plant epidemics, 2) research, development, and application of biotechnology, 3) safeguarding laboratory security, 4) safeguarding the security of our nation’s biological resources and human genetic resources, 5) preventing invasive external

[biological] materials and protecting ecological diversity, 6) dealing with microbiological resistance to medication, 7) preventing biological terrorist attacks, and 8) defending against the threat of biological weapons.⁷⁰⁰

Gao Hucheng's full report to the Standing Committee contained notable information that did not appear in public reporting; most significantly, Gao cited the leak of biological agents from laboratories as a threat to state security that warranted the swift passage of the law. He further called the biosecurity situation in China "grim."⁷⁰¹ Gao's comments were striking in their urgency, and suggested awareness of problems that were not public knowledge:

At the same time that biotechnology has brought progress and benefits to humanity, it has also brought new biosecurity problems and threats. Currently the biosecurity situation in our country is grim. Bio-warfare and traditional biological threats from major emerging and sudden outbreaks of infectious diseases represented by SARS, Ebola, and African Swine Fever, as well as animal and plant epidemics, are occurring as frequently as ever before. Non-traditional biological threats, [such as] bioterrorist attacks, the erroneous use and deliberate misuse of biotechnology, and laboratories that leak biological agents, are clear and obvious.⁷⁰²

Echoing Li Zhanshu's comments when drafting began in July, Gao Hucheng added, "[We must] urgently respond to the aforementioned challenges through biosecurity legislation, use the law to delineate the boundaries of biotechnology development, guide and standardize the research and application of human biotechnology, accelerate the healthy development of biotechnology, and prevent and reduce the dangers that arise from misconduct that harms [society] through biotechnology."⁷⁰³

Gao's characterization of the state of the life sciences in China was critical, almost censorious: "Currently our country's research and development of biotechnology and construction of [research] infrastructure are relatively backward. Large disparities exist in technology, products, and standards. There are few original biosafety technologies [that were invented in China] and few outstanding [research] achievements."⁷⁰⁴ In response to this poor state of affairs, Gao prescribed the following: "[We should] incorporate the building up of the state's biosecurity capabilities into the law..., firmly seize the key and core biotechnologies, protect and promote the development of our

nation's biotechnology and enhance our ability to prevent dangers and threats.”⁷⁰⁵ As we will see shortly, Gao's reference to the importance of “key and core biotechnologies” parallels reports published at the WIV in September 2018 as well as in June, July, and November 2019.

OCTOBER 2019: CCP CENTRAL COMMITTEE DECISION CITES **INFECTIOUS DISEASE CONTROL**

On October 31, 10 days after the NPC Standing Committee had the first reading of the draft biosecurity law, the CCP Central Committee adopted a decision to address “several major problems” pertaining to the modernization of the state administrative system.⁷⁰⁶ It was a sweeping decision that covered a wide range of issues, but of particular note for the purposes of this study was its prescient requirement that officials throughout China “strengthen prevention of public health epidemics and control and prevention of major infectious diseases, and improve the medical insurance and assistance system for major and serious diseases.”⁷⁰⁷ The decision further called for “strengthening the power of national strategic science and technology [and] improving the system of national laboratories.”⁷⁰⁸

OCTOBER/NOVEMBER 2019: RUMORS SPREAD OF A **NEW VIRUS IN WUHAN**, DOCTORS SEE **INFLUX OF PATIENTS**

Anecdotal accounts of an outbreak of a mysterious respiratory illness spreading in Wuhan date to October 2019, concurrent with Wuhan's hosting of the Military World Games. On November 22, Wei Jingsheng, a Chinese dissident who lives in exile in the United States, but hails from a family that played an important role in the communist revolution, told two American friends that he had heard from trusted and well-placed sources in Beijing that “there is a new, dangerous virus spreading in China,” which emerged in Wuhan.⁷⁰⁹ Wei confirmed his account in a separate conversation with Senator Rubio's staff, and noted that he had first heard about the virus during the Military World Games (October 18-27) when CCP sources told him it had been released accidentally in the process of conducting biological weapons research in Wuhan.⁷¹⁰ An investigative journalist in Australia interviewed a frontline doctor from Wuhan who said he and his colleagues began seeing a growing number of patients exhibiting fever and respiratory difficulties in early November, and realized that a coronavirus, likely SARS-related, was the causative agent by early December, but were forbidden by the authorities from discussing the situation.⁷¹¹

NOVEMBER 2019: HUBEI WORK PLAN POINTS TO NEED FOR "SAFE OPERATIONS" AT THE WIV

On November 1, the Hubei Provincial Development and Reform Commission issued a work plan for 2020 with a stated purpose of "accelerating the strategic rise of the central China region and promoting high-quality [economic] development."⁷¹² In one section on "strengthening independent innovation in critical fields,"⁷¹³ the provincial authorities turned their attention to the role of the WIV in meeting its economic goals, and while relatively little was said, it suggested safety problems were on the minds of provincial authorities. The directive called on local officials to "ensure that the Wuhan National Biosafety Laboratory's operations are highly efficient and safe, and aggressively push ahead with the construction of the East Lake laboratory."⁷¹⁴

NOVEMBER 2019: WIV RESEARCHERS HOSPITALIZED WITH COVID-19 SYMPTOMS

The U.S. Department of State released a factsheet in January 2021 on its official website that stated the following: "The U.S. government has reason to believe that several researchers inside the WIV became sick in autumn 2019, before the first identified case of the outbreak, with symptoms consistent with both COVID-19 and common seasonal illnesses. This raises questions about the credibility of WIV senior researcher Shi Zhengli's public claim that there was 'zero infection' among the WIV's staff and students of SARS-CoV-2 or SARS-related viruses."⁷¹⁵ In May 2021, the Wall Street Journal (WSJ) reported on previously classified details that went beyond what was contained in the State Department factsheet. These details included the fact that three WIV researchers became ill specifically in November 2019, all of whom ended up in the hospital.⁷¹⁶

In August 2021, Josh Rogin, a veteran foreign policy columnist for the Washington Post, revealed that the intelligence had further shown that at least one of the WIV researchers became ill in early November, that all three worked at Shi Zhengli's bat coronavirus lab at the WIV, and that they exhibited symptoms highly specific to COVID-19, including the loss of smell and ground-glass opacities in their lungs.⁷¹⁷ "What it says is that the symptoms that these sick researchers had were not your everyday flu symptoms," Rogin said, "In other words, they were COVID-specific symptoms necessarily, and these include no smell and what are called ground-glass opacities in the lungs. That doesn't medically prove that they had COVID, but that's some pretty specific symptoms."⁷¹⁸

NOVEMBER 2019: WIV PURCHASES PCR TESTING EQUIPMENT

On November 6, the WIV purchased fluorescent quantitative PCR equipment used in the detection of viral RNA for RMB 308,440 (approximately US\$48,659), according to procurement orders on a Chinese website examined by an Australian research firm.⁷¹⁹ As is now widely known, SARS-CoV-2 is an enveloped, single-strand, positive-sensed RNA coronavirus, and PCR tests are used to detect it.⁷²⁰ PCR assay is also used to detect the genetic material of influenza viruses.⁷²¹ All in all, spending on PCR equipment in Hubei Province jumped from 36.7 million RMB (approx. US\$5.7 million) in 2018 to 67.36 million RMB (approx. US\$10.6 million) in 2019.⁷²²

NOVEMBER 2019: PEKING UNIVERSITY DRILLS RESPONSE TO LEAK OF HAZARDOUS BIOWASTE

On November 8, the School of Life Sciences at Peking University, China's oldest and most prestigious university, held safety drills to mark "fire prevention day," which the school observes annually on November 9. The school required all of its students and faculty to participate in the safety drills.⁷²³ In addition to drills in which the students practiced emergency evacuation procedures during a fire, the school also held a separate drill for students that simulated "a leakage accident" at one of the school's laboratories involving what was only described in general terms as "hazardous [bio]waste" and a "[micro]biological growth medium."⁷²⁴

NOVEMBER 2019: WIV'S CCP BRANCH ALLUDES TO PATHOGEN ESCAPE, POOR WORK CONDITIONS

On November 12, the CCP branch at the WIV's BSL-4 laboratory located on its Zhengdian campus published a report touting its achievements since the opening of the BSL-4 lab in 2018.⁷²⁵ The report noted the size of the party branch, and characterized the CCP cohort as a "young and enthusiastic team."⁷²⁶ It described various sessions that the party branch had held to study Xi Jinping Thought, and its work to expand the party's organizational reach inside the WIV, with a goal of "achieving full coverage of party building work."⁷²⁷

The report highlighted five issues of particular significance. First, it revealed that the so-called "stranglehold problem" had led to insufficient access to "key and core equipment" that is used to operate a lab safely. The party branch stressed:

[We] placed extreme importance on solving the "stranglehold" problem of importing key and core equipment, [and] by organizing meetings to exchange

views on the management of key and core equipment, in which the personnel responsible for managing each piece of key and core equipment introduced its structural composition, operational principles, control logic, and other aspects, everyone carried out fulsome discussions of the technologies, their biosafety [features], and the operating procedures for equipment that they were concerned about in order to continuously overcome the technological obstacles.⁷²⁸

Readers no doubt realize that this report was not the first to raise concerns about the “stranglehold problem of key and core equipment;” such references were first observed in WIV reporting in September 2018⁷²⁹ and at the Wuhan branch of the CAS in December 2018.⁷³⁰ In June 2019, the WIV published three separate reports⁷³¹ that cited the problem of stranglehold technologies, and yet another in July 2019.⁷³²

Pressure to deal with this problem came from the very top. The November 12 WIV report reminded its readers that Xi Jinping himself had “emphasized that ‘key and core technologies are the treasure of the nation,’” and that “the construction of the P4 laboratory is of extreme importance to public health in China.”⁷³³ A recent report by Hou Jianguo, the current party secretary and president of CAS, quoted Xi as having told China’s scientists: “Our country faces many problems with stranglehold technologies, [and] the root cause is we cannot keep up in basic theory and research, we have not understood the foundational things and the ground floor [that supports innovation].”⁷³⁴

While we were unable to locate WIV reports detailing the precise pieces of equipment affected by the “stranglehold problem,” the comments cited throughout this report clearly indicate that some equipment pertained to biosafety. We can further deduce from the existence of a “Research and Development Center for Key Equipment in Synthetic Biology” housed at the Shenzhen Institute of Synthetic Biology,⁷³⁵ which was founded by the CAS in December 2017, that 1) some of the equipment shortages at the WIV likely related to its work with manipulating viruses and bioengineering pathogens (i.e. synthetic biology), and 2) the “stranglehold problem,” as it applies to the fields of virology and synthetic biology, was China-wide, and not limited to the WIV.

The second issue of particular significance that featured in this November 12 report was its surprisingly frank description of the routine dangers of the work at the WIV’s BSL-4 lab, including its insinuation that a biosafety incident involving a dangerous pathogen had occurred:

Owing to [the fact] that the subject of research at the P4 lab is highly pathogenic microorganisms, inside the laboratory, once you have opened the stored test tubes, it is just as if having opened Pandora's Box. These viruses come without a shadow and leave without a trace. Although [we have] various preventive and protective measures, it is nevertheless necessary for lab personnel to operate very cautiously to avoid operational errors that give rise to dangers. Every time this has happened, the members of the Zhengdian Lab Party Branch have always run to the frontline, and they have taken real action to mobilize and motivate other research personnel.⁷³⁶

Third, this WIV report described a high-pressure work environment and other disadvantageous conditions that could create biosafety risk factors. "In the laboratory, they often need to work for four consecutive hours, even extending to six hours," the report revealed: "During this time, they cannot eat, drink, or relieve themselves. This is an extreme test of a person's will and physical endurance. This not only demands that research personnel possess proficient operational skills, but they also...possess the ability to respond to various unexpected situations."⁷³⁷ U.S. biosafety experts who have managed BSL-4 labs told Senator Rubio's staff that exceeding two consecutive hours of work in a BSL-4 environment is likely to lead to fatigue, and that they would not recommend going beyond three hours. The report noted that the lab's political leadership, specifically Tong Xiao, was constantly pushing the researchers at the BSL-4 lab to do more: "Don't look at your work duties as pressure. Every task is an opportunity and a ladder for continuous self-improvement. Our team's belief is that suffering losses is good fortune...."⁷³⁸

Fourth, the WIV report referenced problems with the construction of the BSL-4 lab, inadequate standards, and a lack of experience with relevant technologies. The party branch reported:

From the outset of construction, the Wuhan P4 Lab had been facing a predicament [caused by] the "three nos": no equipment and technology standards, no design and construction teams, and no experience operating or maintaining [a lab of this caliber]. Through the party members of the Zhengdian Lab Party Branch taking the lead to attack and conquer these difficulties, [and] bravely pressing forward, in the end, [we] brought into reality the "three haves" of a complete system of

standards, a superior team that operates and maintains [the lab], and valuable experience with construction.⁷³⁹

As we have seen with the “stranglehold” problem, the “three nos” were also a recurring theme in WIV reporting. On June 10, a visiting Hubei provincial CCP official acknowledged the problem, using terms almost verbatim to this November report, suggesting that CCP authorities had settled on that formulaic language as the framework for how the construction problems at the lab should be described.⁷⁴⁰ Another safety oversight that apparently occurred during the site selection phase of planning for the laboratory’s construction was flooding risk. The November 12 report recalled that the WIV was threatened by severe flooding in 2016, and how the “first thing the party members of the lab thought about was the safety of the equipment.”⁷⁴¹ It goes on to describe how the waters were so high that nearby streets were impassable, and researchers had to hike through a forested area bordering the Zhengdian campus to reach the laboratories and ensure their safety.⁷⁴²

Fifth, the party branch suggested that the WIV resorted to technical workarounds and modifications to deal with the “stranglehold” problem and the “three nos,” as well as to satisfy the CCP’s demands for indigenous innovation. The report noted: “Going through [a process] of digesting, absorbing, [and] reinventing imported equipment, [we] made the lab construction satisfy domestic and international standards, [and] made the French design concepts conform to the requirements of Chinese construction, etc.”⁷⁴³ It provided the following example: “For example, [regarding] the protective structure for the core zone of the laboratory, the research team, following repeated testing, used an advanced laser welding method, which had a better airtight effect and was longer lasting, to replace the traditional glue sealant method. The P4 team possesses the intellectual property patent for this technology. The mathematical model of [our] independent design with automated controls produced a more stable differential pressure control effect.”⁷⁴⁴ Workarounds applied to essential technologies, such as the sealing off a high-containment laboratory from the outside world, could have unintentionally created biosafety vulnerabilities, particularly when working with pathogens that transmit through aerosols, such as SARS-CoV-2.

Another interesting feature of this WIV report is that a CCP website run by the CAS published an earlier version of it on August 30.⁷⁴⁵ The November 12 version analyzed

above contained key information that was added later to the August 30 original text, and some deletions were also observed between the August and November texts. For example, the November version added a line to the opening that stressed the advanced nature of the BSL-4 lab complex: "They built and operate our country's first P4 laboratory; this laboratory has the most advanced protective equipment and highest biosafety level."⁷⁴⁶ Another new line pointed out that the seven most senior members of the team of technicians that built the laboratory were all CCP members.⁷⁴⁷ One possible reason that this detail was inserted, especially if one reads the November report as implying that an accident of consequence had happened, was to subtly solicit the protection of the CCP system, which tends to shield its own from accountability in times of trouble, provided that they "observed party discipline."⁷⁴⁸

Another change that could be interpreted as the WIV researchers trying to ingratiate themselves to the political system was the addition of the two Xi Jinping quotes cited in the analysis above; neither of the quotes appeared in the August original. Other changes made the text less specific to the WIV. A sentence about the need to wear positive pressure suits and take chemical showers, which immediately preceded the sentence about excessively long work hours, originally designated "Wuhan P4 Laboratory Personnel" as its subject, whereas the revised version in November simply had "laboratory personnel" as the subject of the same sentence.⁷⁴⁹ Likewise, the clause in the pull quote above – "Owing to [the fact] that the subject of research at the P4 lab is highly pathogenic microorganisms..." – originally read: "Owing to [the fact] that the subject of research at the Wuhan P4 lab is highly pathogenic microorganisms...."⁷⁵⁰

The WIV's admission that it had deviated from the French construction design was another piece of key information that made its debut in November. The August version simply stated: "Going through [a process] of digesting, absorbing, [and] reinventing imported equipment, [we] made the lab construction satisfy domestic and international standards." It was the November version that added the clause "[and] made the French design concepts conform to the requirements of Chinese construction, etc."⁷⁵¹ The example given of the WIV's deviation from the French design – their decision to forgo the use of the traditional glue sealant in the hot zone of the laboratory in favor of their own novel laser welding method – was also missing in the original report but appeared in the November version.⁷⁵²

The most curious changes to the November report pertained to the passage that warned of the Pandora's Box that could be unintentionally opened as a result of "operational errors." Let us review the relevant passage again with the language that was added between August and November bolded for the sake of comparison:

Owing to [the fact] that the subject of research at the P4 lab is highly pathogenic microorganisms, inside the laboratory, once you have opened the stored test tubes, it is just as if having opened Pandora's Box. These viruses come without a shadow and leave without a trace. Although [we have] various preventive and protective measures, it is nevertheless necessary for lab personnel to operate very cautiously to avoid operational errors that give rise to dangers. Every time this has happened, the members of the Zhengdian Lab Party Branch have always run to the frontline, and they have taken real action to mobilize and motivate other research personnel.⁷⁵³

Needless to say, the colorful language they employed about how easily and surreptitiously pathogen escape can occur was a noteworthy addition in November, as were the words of wisdom about the precaution required to avoid operational errors. A question that seems inescapable is this: What prompted the authors of the report to insert these admonitory statements before republishing the piece on the WIV website on November 12?

NOVEMBER 2019: UNPUBLISHED GOVERNMENT DATA POINTS TO COVID-19 CASES

The China news editor of the South China Morning Post (SCMP), a veteran reporter with more than two decades of experience, reviewed official government data that documented a 55-year-old from Hubei Province (Wuhan is its capital), who contracted the virus on November 17, apparently the earliest confirmed case of COVID-19.⁷⁵⁴ "From that date onwards, one to five new cases were reported each day. By December 15, the total number of infections stood at 27 – the first double-digit daily rise was reported on December 17 – and by December 20, the total number of confirmed cases had reached 60," according to the SCMP.⁷⁵⁵ At the time of its publication in March 2020, the SCMP indicated that Chinese authorities had identified at least 266 people who were infected in 2019, all of whom came under medical surveillance.⁷⁵⁶ By contrast, the PRC authorities only acknowledged 174 cases of COVID-19 patients who fell ill in 2019 in their reporting to the WHO.⁷⁵⁷

The SCMP provided the following details on the earliest cases: “Of the first nine cases to be reported in November – four men and five women – none has been confirmed as being patient zero. They were all aged between 39 and 79, but it is unknown how many were residents of Wuhan.”⁷⁵⁸ An independent researcher who examined the publicly available genomic sequences for the reported COVID-19 cases in China identified a genetic cluster of the earliest Clad A patients, one of whom was a 39-year-old man who had a bronchial lavage specimen reportedly collected on January 5, 2020.⁷⁵⁹ According to the sequence records, this patient along with the other patients in this early genetic cluster were treated at the General Hospital of the Central Theater Command of the PLA, less than two miles from the WIV.⁷⁶⁰

As discussed earlier in this report, Yu Chuanhua, professor of biostatistics at Wuhan University, gave an interview in February 2020 in which he discussed his work to compile a nationwide database of COVID-19 cases. Yu’s database had many cases, one as early as September 2019 (see above), predating the cases in December 2019 that the PRC authorities claim were the earliest.⁷⁶¹ Yu noted the following about the cases captured in his database: “In November, there were two cases of [confirmed] patients, the onset of their symptoms was between November 14 and November 21, 2019.... [A]nother patient that got sick in late November was hospitalized on December 2, and was clinically diagnosed with pneumonia.”⁷⁶²

NOVEMBER 2019: BEIJING RESPONDS TO BIOSAFETY INCIDENT(S) AT THE WIV

On November 19, the WIV hosted a one-day safety training that was attended by senior personnel from the Wuhan branch of the CAS, the WIV’s parent organization, as well as WIV research department heads, other “responsible personnel” from all departments, and personnel who work on general safety and security matters for the WIV and CAS as a whole.⁷⁶³ Ji Changzheng, the director of the Office of Technology Safety and Security in the General Office of the CAS, was “specially invited” from Beijing to Wuhan to deliver a presentation that was titled “The Chinese Academy of Sciences Safety and Security Work: [The Current] Situation and Duties.”⁷⁶⁴ The most remarkable element of Ji’s report was that he conveyed “important oral and written instructions” from Xi Jinping to the WIV with regard to a “complex and grave situation”:

Ji Changzheng transmitted the instructions and demands of the CCP Central Committee and State Council regarding safety and security work and focused on

directing everyone [at the WIV] to internalize and implement the important oral remarks and important written instructions regarding safety work from General Secretary Xi Jinping and Premier Li Keqiang. At the same time, [Ji] linked [the instructions] to many large-scale cases of domestic and foreign safety incidents in recent years, and from the perspective of shouldering responsibility, standardizing operations, emergency planning, and inspecting hidden dangers one-by-one, [he] laid out a deep analysis, with many layers and taken from many angles, which vividly revealed the complex and grave situation currently facing safety work. Finally, Ji Changzheng focused on actual conditions at CAS with a summary and analysis of laboratory safety, technology security, student safety, campus security, and Internet security among other common problems that exist in its security and safety management work.⁷⁶⁵

The term “written instructions” used by Ji Changzheng referred to an internal CCP system of written directives called pishi (批示). A pishi occurs when a senior CCP leader receives a printed memorandum on a discreet issue, important development, or worrisome trend, and handwrites instructions on the report to be conveyed to the lower-level officials who are responsible for the subject of the report.⁷⁶⁶ An analysis of the significance of the pishi appears below at the end of this entry in the chronology.

In response to the safety problems experienced at the WIV, Ji Changzheng gave the following recommendations:

[T]o do a good job with safety management work, first, [you must] strengthen your knowledge and elevate the standing of politics [as a priority]; second, [you must] clarify [lines of] authority and responsibility, and push forward with the implementation of responsibility; third, [you must] plan, coordinate, and strengthen the administration of management controls; [and] fourth, [you must] strengthen research of scientific and technological safety and security risks and the building of an early warning monitoring system. Safety management personnel should strengthen their commitment to the mission, shoulder their responsibilities, and with single mindedness work together as one to build a protective barrier for scientific research and development....⁷⁶⁷

Note that Ji’s reference to an “early warning monitoring system” echoes Xi Jinping when he said in January 2019: “It is necessary to speed up the establishment of an early

warning monitoring system for scientific and technological safety.”⁷⁶⁸ Likewise, Ji’s reference to a “complex and grave situation currently facing safety work” echoes Xi’s comments to the Central Party School in September 2019 when he repeatedly forecast “complex and grave situations” that would require cadres to engage in fierce political struggle.⁷⁶⁹

In addition to the summary of Ji’s remarks, the report noted that a security manager at the WIV also delivered remarks: “During the training, Hu Qian, the Deputy Director of the Office of Safety and Security at the Wuhan Institute of Virology, summarized several general problems that were found over the course of the last year during safety and security investigations, and [he] pointed to the severe consequences that could result from hidden safety dangers, and stressed that the rectification of hidden safety risks must be thorough, and management standards must be maintained.”⁷⁷⁰ Hu further admonished the lab managers to “strengthen the dissemination and implementation of the system of safety laws, regulations, and rules, take further steps to refine the operational work flow processes, prevent various kinds of safety risks, and ensure safe production for the research and development [activities] at the institute.”⁷⁷¹

ANALYZING THE SIGNIFICANCE OF JI'S VISIT

All indicators suggest that Ji Changzheng's visit to Wuhan was out of the ordinary and event driven. The timing was curious, coming on the heels of the conclusion of the two-month political inspection of the CAS that commenced at the direction of the CCP Central Committee in September.⁷⁷² We found only one report of another external engagement for Ji during November 2019, and that was a routine training at the CAS Institute of Botany, which is located in Beijing where Ji is based.⁷⁷³ No reports of Ji's work travel outside of Beijing were found for the months of October or December 2019, and in November 2019, he appears to have travelled only to Wuhan. Two inspection and training trips, one to the cities of Urumqi and Kashgar in the XUAR from August 27-28, and another to Hefei, the capital of Anhui province, from September 9-12, appear to have been his most recent travel prior to the November 19-22 visit to Wuhan.⁷⁷⁴

Notably, Ji's training sessions were often described as "annual" or "routine." The visit to the WIV was not described in those terms (Ji was "specially invited" to the WIV), and the WIV report had a more pronounced tone of seriousness than the other reports reviewed for this study. Moreover, the WIV had already held its annual biosafety training in April.⁷⁷⁵ Ji does not appear to have visited the WIV at any point prior to November 2019, insofar as can be established from searches of the WIV and CAS websites.

The available evidence further indicates that Ji Changzheng's discussion of the pishi was not a casual reference to a general directive but likely had specific relevance to the WIV. For the purpose of comparison and to aid in determining the significance of the WIV report, a total of 18 other reports published on the CAS website between 2017 and 2022 were reviewed for references to pishi from Xi Jinping and/or Li Keqiang. These reports described trainings and inspections conducted in whole or in part by Ji Changzheng at CAS facilities located in the cities of Beijing,⁷⁷⁶ Nanjing,⁷⁷⁷ Chongqing,⁷⁷⁸ Guangzhou,⁷⁷⁹ Urumqi,⁷⁸⁰ Kashgar,⁷⁸¹ Hefei,⁷⁸² Shenyang,⁷⁸³ Changchun,⁷⁸⁴ Ningbo,⁷⁸⁵ and Shanghai.⁷⁸⁶ Ji did not reference a pishi on "safety work" from Xi and/or Li in any of these 18 reports, including the 10 reports from 2019. The WIV report appears unique in this regard.

In two of the 18 reports, a passing mention of a pishi from Xi was found, but the reference was not attributed to Ji himself, and the pishi in question did not appear to be related to the pishi that Ji transmitted to the WIV. For example, in May 2018, Ji

conducted a training for Tibet-based CCP cadres held at the CAS Institute of Computing Technology in Beijing. During this training, another official, not Ji, referred to a pishi by Xi pertaining to “developing a cyber corps that meets the mark” to strengthen the party-state’s efforts to control Tibet.⁷⁸⁷ This is clearly unrelated to the biosafety-focused pishi that Ji delivered to the WIV.

In June 2022, an annual safety training held at the Changchun branch of the CAS made a general reference to “studying and transmitting the spirit of important oral and written instructions of General Secretary Xi Jinping on safety/security stability work.”⁷⁸⁸ While this pishi bears a closer resemblance to the one described at the WIV, it was not Ji who invoked it, and the description differed in its addition of the word “stability,” its lack of the urgent tone found in the WIV report, and the characterization of the event as an annual training, all of which suggests this pishi is different from, and likely came later than, the one invoked at the WIV.

It was also not the case that Ji Changzheng habitually invoked Xi Jinping’s name to draw upon his authority, with or without reference to a pishi. Twelve of the 18 reports of Ji’s activities included no mention of Xi at all. Only in two reports describing Ji’s visits to Shenyang and Ningbo in June and July 2022 respectively did Ji invoke the “spirit of General Secretary Xi Jinping’s important oral instructions on safe production.”⁷⁸⁹ Ji did not otherwise invoke Xi’s name in the 18 reports found on the CAS website, including in any of the eight reports from 2019 that did not pertain to the WIV. To reiterate, the only public report in which Ji spoke of a pishi on “safety work” linked to both Xi Jinping and Li Keqiang was the WIV report of November 19, 2019.

Ji Changzheng does not seem to be a man prone to rhetorical flourishes and hyperbole. Ji did not repeat a key phrase that appears in the report describing his visit to the WIV – the “complex and grave situation currently facing safety work” – in any of the other 18 reports outlining his activities elsewhere around the country. He only used that ominous language at the WIV. Furthermore, if we suppose that there was no pishi specifically applicable to the WIV for Ji to deliver, and Ji had merely sought to invoke Xi’s authority in a general sense to make his audience pay attention, Ji had two options available that he did not take. First, Ji could have followed the CCP convention of referring to a relevant leader’s speech. Xi Jinping had, after all, just delivered a long and detailed speech specifically to the CAS as recently as May 2018.⁷⁹⁰ Second, official CAS

reporting indicates that Xi issued a pishi specifically regarding “the work of the CAS” sometime in 2017.⁷⁹¹ Ji chose not to mention Xi’s 2018 speech to the CAS, or his 2017 pishi on the work of CAS, but rather referred to a pishi on “safety work.”

The pishi that Ji Changzheng invoked at the WIV appears to be distinct from Xi’s 2017 pishi. Official reporting described the focus of the 2017 pishi as “science and technology innovation,” and suggested it was largely congratulatory and positive in its tone.⁷⁹² Significantly, the word “safety/security” (anquan) was not mentioned a single time in the CAS report of Xi’s pishi in 2017, and yet that is precisely the word that Ji used to encapsulate the somber and serious theme of the pishi that he was tasked with transmitting to the WIV in November 2019.

The context of the WIV report leaves the reader with the impression that the memorandum that Xi Jinping and Li Keqiang received, which became a pishi after they wrote instructions in the margins, likely dealt with “safety work” relevant to the WIV in particular, or the CAS as a whole. Given the specialized nature of such a topic, and the virtually limitless range of potential problems that could be brought to the two top leaders’ attention on any given day in a country of more than 1.4 billion people, it stands to reason that the problem was deemed severe enough to warrant being raised to the highest level.

For another point of comparison, consider the fact that an explosion at a laboratory in Beijing, which killed three people and generated headlines, did not rise to the level of Xi Jinping or Li Keqiang, or prompt a pishi from either of them. The directive issued in response to the lab explosion only mentioned a pishi from “leading comrades in the State Council.”⁷⁹³ Not even Li Keqiang, the head of the State Council, was named, which means the issue was handled at the vice premier level or lower. Some observers maintain that Xi Jinping is a micromanager who is using the pishi system more frequently than his predecessors.⁷⁹⁴ In any case, most experts agree that Xi’s concentration of power in his hands and top-down decision-making style are now key features of CCP governance,⁷⁹⁵ which have been disruptive to the political system and provoked a backlash, both at home and abroad.⁷⁹⁶

NOVEMBER 2019: WIV HOSTS TRAINING ON "TECHNIQUES FOR CONDUCTING EXPERIMENTS"

Immediately following the small-scale session that Ji Changzheng held with the CAS and WIV management on November 19, he led a separate "Training on Biosecurity Laboratory Management and Techniques for Conducting Experiments" on November 20-22, which involved more than 150 WIV participants as well as personnel from BSL 1-3 labs at other research institutes in Wuhan.⁷⁹⁷ Zhao Chihong, the Director of Laboratory Management at the CCDCP, joined Ji to lead the training.⁷⁹⁸ "The content of the [training] course included the national biosecurity law, regulations, and standards, the management system for high-containment biosecurity laboratories, methods for assessing biosafety risks in laboratories, the storage of bacterial and viral strains, and the management of waste from animal experiments and laboratories," according to the WIV website.⁷⁹⁹ It is worth noting that the problem of safe storage and handling of bacterial and viral strains will reappear as a theme of concern in a central government directive issued in February 2020.

Let us briefly consider the differences between this training and the November 19 meeting that preceded it. The fact that two separate reports were issued rather than one consolidated report of Ji's visit suggests that these were viewed as two distinct events. Ji's meeting on November 19 was aimed at WIV management, not its rank-and-file researchers. It was attended by senior managers, WIV research department heads, other "responsible personnel," and personnel who worked specifically on safety and security matters. The training on November 20-22, by contrast, was much larger and inclusive in scope, with over 150 people attending from the WIV alone as well as researchers drawn from nearby labs. Zhao Chihong co-led the larger training with Ji; there is no mention of Zhao at the meeting on November 19. All of this suggests that the message that Ji was sent to deliver on November 19 in advance of the larger training was highly specific and likely deemed inappropriate for wider distribution to the larger audience that would assemble on November 20-22 for the more general biosafety training.

NOVEMBER 2019: ENGLISH TEACHER DEVELOPS PNEUMONIA, LATER CONFIRMED TO BE COVID-19

On November 25, a 25-year-old Welsh man named Connor Reed, who was teaching English in Wuhan at the time, fell ill with flu-like symptoms. The symptoms appeared to wane after a few days, only for Reed to develop pneumonia on December 6, which was

so severe that he sought hospital care because he feared he might suffocate.⁸⁰⁰ On January 16, 2020, the hospital that treated him for pneumonia formally informed Reed by letter that he had been infected by the novel coronavirus.⁸⁰¹ Reed kept a diary of the whole episode, the information from which he shared with various British print and broadcast media outlets beginning in March 2020 as the pandemic exploded in his home country. He became known as the first Briton to contract the virus.⁸⁰²

NOVEMBER 2019: WIV AND PLA SUBMIT PAPER ON ENHANCING CORONAVIRUS ENTRY TO CELLS

On November 27, a team of 13 Chinese researchers – including Shi Zhengli and Chen Jing of the WIV, Zhou Yusen and three others from the PLA AMMS Institute of Microbiology and Epidemiology, and seven others based in the United States – submitted a paper for publication in the *Journal of Virology* that examined the issue of antibody-dependent enhancement (ADE) of viral entry into human cells.⁸⁰³ This paper is significant for at least two reasons. First, it showed the close and collaborative relationship between the WIV and the PLA on coronavirus research detailed in the background section that precedes this chronology. Second, and more importantly, ADE is a major topic of concern for the development of vaccines and therapeutics, and the molecular mechanism behind it remains poorly understood.⁸⁰⁴ This study explored how a neutralizing monoclonal antibody (MAb), which targets the receptor-binding domain of the spike protein of the MERS coronavirus, mediates viral entry. “Our study reveals a novel molecular mechanism for antibody-enhanced viral entry and can guide future vaccination and antiviral strategies,” according to the authors.⁸⁰⁵ While the study in question focused on MERS, it is conceivable that this research played a role in a larger effort led by Zhou that was likely already underway to develop a vaccine for SARS-CoV-2.

NOVEMBER 2019: BRUCELLOSIS FOUND IN PATIENTS IN LANZHOU AFTER INCIDENT AT VACCINE PLANT

On November 28, health officials in Lanzhou Municipality, the capital of Gansu Province in northwestern China, discovered an outbreak of the bacterial disease brucellosis when patients from the Lanzhou Veterinary Research Institute presented themselves with symptoms.⁸⁰⁶ By November 2020, the total number of people infected as a result of the outbreak stood at over 10,000.⁸⁰⁷ According to a statement from the Lanzhou Municipal Health Commission issued in September 2020, the outbreak originated at a

biopharmaceutical factory owned by China Animal Husbandry Industry Co. between the dates of July 24 and August 20, 2019. It was caused by the factory having used expired disinfectants to manufacture vaccines, which left the bacteria present in its polluted gas produced as waste during the manufacturing process. The contaminated waste gas formed aerosols, which were carried by wind down to the Lanzhou Veterinary Research Institute, where the outbreak was first uncovered in November 2019.⁸⁰⁸

Although the brucella outbreak was caused by a biosafety incident, it occurred at a vaccine manufacturing plant, not a laboratory, and the PRC authorities did not refer to the incident as a “leak.”⁸⁰⁹ Moreover, because the incident was not discovered until November 28, 2019, according to the Lanzhou Municipal Health Commission, the timing precludes the possibility that the “explanation” submitted to the NPC Standing Committee on October 21 was referring to the brucella incident when it invoked the risk of a “laboratory leak” as a justification for passing the draft National Biosecurity Law.

NOVEMBER/DECEMBER 2019: WUHAN CLOSES SCHOOLS BECAUSE OF OUTBREAK

Some frontline doctors in Wuhan, who were interviewed by an investigative journalist in 2020, reported that classes in some high schools were cancelled in November 2019 because students were getting infected with what was being described as a severe influenza that had been observed throughout Hubei Province.⁸¹⁰ So severe was the “influenza” outbreak at the time that nearby Xianning, a city roughly 60 miles due south of Wuhan, had reported 20 times the normal rate of flu cases, many of which in Xianning and elsewhere were categorized as cases of “unknown cause.” Wuhan was reportedly the third worst infected city in the province.⁸¹¹

A diplomat stationed at the U.S. Consulate General in Wuhan, writing in April 2020, recalled that local authorities closed down public schools in December 2019, in response to what we now know was COVID-19, roughly two weeks before they admitted to the public that an outbreak was underway. The diplomat wrote: “When city officials began to close public schools in mid-December to control the spread of the disease, the team passed the word to Embassy Beijing and continued monitoring. The possibility of a new viral outbreak was always on the consulate’s radar. Still, the working assumption in every scenario had always been that, as in past outbreaks like H1N1 (known as swine flu), it would appear in rural areas first and then spread to major urban centers across China.”⁸¹² Another indication that COVID-19 cases were possibly being misdiagnosed

as influenza in fall 2019 is that the Chinese National Influenza Center stopped including data for flu cases in its weekly report beginning on the week of December 16-22.⁸¹³

DECEMBER 2019: THE ONSET OF SYMPTOMS FOR THE FIRST OFFICIALLY ACKNOWLEDGED PATIENT

On December 1, a man began to experience the onset of symptoms of COVID-19, who was later described by PRC authorities as the earliest patient who had “continuous exposure” to the Huanan Seafood Market in Wuhan, which the authorities would link to the outbreak starting on December 30. He also became the first fatal case. At the time of his symptom onset, none of his family members had developed fever or respiratory symptoms, but five days after his illness began, the patient’s 53-year-old wife, who “had no known history of exposure to the market,” developed pneumonia and was hospitalized.⁸¹⁴ On December 10, two more patients developed symptoms who had no exposure to the market, as did one patient who had market exposure.⁸¹⁵ This means that by no later than December 10, Wuhan doctors had documented three cases of patients with pneumonia that had no exposure to the market, strongly suggesting person-to-person transmission was likely occurring. In fact, a January 2020 study of officially acknowledged cases from December 2019 found that only 66 percent of such cases involved direct exposure to the market, meaning 34 percent could not be linked to the market at all.⁸¹⁶

In the words of the 29 authors of the study, all of whom were Chinese researchers and clinicians: “[E]vidence so far indicates human transmission for 2019-nCoV. We are concerned that 2019-nCoV could have acquired the ability for efficient human transmission.”⁸¹⁷ As will be documented later in this chronology, such evidence of person-to-person transmission was available to and recognized by astute Chinese experts from the very beginning. The authorities would withhold this information when they disclosed the outbreak to the public on December 31, and they continued to deny that person-to-person transmission was occurring until January 20.

Doctors and epidemiologists in China, concerned as they are with protecting public health, no doubt sought to share information about the transmissibility of the novel coronavirus long before January 20, and indeed some of them paid a high price for disclosing information about the outbreak without state authorization. Selective disclosure, manipulation, and withholding of key information from the public is the

habitual practice of China's secretive political leadership, even in ordinary times, much less when crisis strikes. The CCP seeks to "guide public opinion" through censorship as well as controlling and shaping the flow and content of information available to the public.⁸¹⁸ It is an essential element of what the CCP calls "ideological work" or "thought work."⁸¹⁹

DECEMBER 2019: WUHAN CDCP MOVES NEAR MARKET

On December 2, the Wuhan CDCP finished its relocation from one part of the city to a new location within walking distance of the Huanan Seafood Market,⁸²⁰ which at the end of December, authorities would link to the outbreak of "pneumonia of unknown origin." The moving process for the Wuhan CDCP likely began sometime in October.⁸²¹ It hosts a BSL-2 laboratory that works on bat coronaviruses among other pathogens. During the WHO's month-long study of the origins of the pandemic that was conducted in January and February 2021, the Wuhan CDCP made dubious claims (which the WHO accepted at face value) about its research activities that are contradicted by publicly available evidence: "The Wuhan CDC lab which moved on 2nd December 2019 reported no disruptions or incidents caused by the move. They also reported no storage nor laboratory activities on CoVs or other bat viruses preceding the outbreak."⁸²²

By contrast, publicly available Chinese sources indicate that Tian Junhua, a researcher at the Wuhan CDCP, claimed to have caught as many as 10,000 bats in the wild between 2012 and 2020, from which he captured tissue and virus samples that he stored at the Wuhan CDCP's BSL-2 laboratory.⁸²³ Just eight days after the Wuhan CDCP's move was completed, Tian featured prominently in a television documentary in which he was depicted in caves taking samples from wild bats without taking proper precautions (see below).⁸²⁴

DECEMBER 2019: WIV NEEDS AIR INCINERATOR, LOOKS TO OUTSOURCE BOILER ROOM OPERATION

On December 3, the WIV issued its fifth notice of 2019 on the official procurement website for the PRC central government, and this time the WIV was seeking to procure air incineration devices and testing services. The procurement notice did not specify which WIV campus needed this equipment, though it did note that the equipment was not produced anywhere in China. The budget allowed was approximately US\$46,232 (RMB 320,000).⁸²⁵

On December 16, the WIV issued its sixth procurement notice of 2019. The institute was seeking to hire an outside company for a year to operate the boiler room for its BSL-4 laboratory. Specifically, the tender defined the scope of duties required as “the operation, maintenance, and annual inspection of the thermal heating system components between the boiler room (including) and the outlet of the P4 [aka BSL-4] sub-cylinder.”⁸²⁶ The budget allotted was approximately US\$49,306 (RMB 330,000).⁸²⁷

DECEMBER 2019: HUBEI VICE GOVERNOR **INSPECTS** THE WIV’S BSL-4 LABORATORY

On December 5, Xiao Juhua, the vice governor of Hubei Province, visited the WIV to “inspect” its BSL-4 laboratory, according to the Hubei Daily.⁸²⁸ The report suggested that Xiao was not pleased with what she found: “Xiao Juhua conducted a site investigation of the Wuhan National Biosecurity Laboratory (P4 Lab) and gained a detailed understanding of the course of its construction, its current research, direction of development, etc., and immediately called a meeting [of lab management] to carry out support measures on site.”⁸²⁹ Xiao also sought to convey to the WIV its importance to the CCP in terms of state security and biotech development: “She pointed out that the Wuhan P4 lab has a significant status and function, and is related to state security, social stability, and the health of the people. It is an important foundation of [the plan] to make Wuhan a comprehensive national science center and an important pillar of the development of the Hubei biopharmaceuticals and health industry.”⁸³⁰

DECEMBER 2019: DUTCH VIROLOGIST LEARNS OF **“OUTBREAK OF UNKNOWN DISEASE”**

In May 2020, Dr. Ron Fouchier, a professor of virology and influenza expert at the Erasmus University Medical Center, appeared in a documentary filmed by the Dutch television program Tegenlicht (“Backlight”) on the Dutch public broadcast station VPRO. During the interview, Fouchier was asked: “Where were you when you first heard about the crisis in China?” and he responded: “We hear these things early on, so it was the first week of December. We were told about an outbreak of an unknown disease in Wuhan. The first few weeks of rumors were identical to the ones in 2003 with the SARS outbreak.”⁸³¹ Like the WIV, Fouchier is known for engaging in controversial gain-of-function studies that artificially modify viruses to better infect humans and increase their pathogenicity. In 2011, Fouchier caused a global stir as a result of his work to modify H5N1, a deadly avian flu that normally infects birds and only rarely infects humans in

its natural form, to render it highly transmissible through the air between ferrets, which catch the flu through the same mechanism as humans do.⁸³²

While Fouchier did not reveal in the VPRO interview from whom he heard about the “outbreak of an unknown disease in Wuhan” during the first week of December, it stands to reason that he would have heard it from a colleague in the field, which likely means a researcher at the WIV, whose studies of coronaviruses in some ways mirror Fouchier’s studies with influenza. PRC authorities would not publicly admit to the outbreak until December 31. Dr. Shi Zhengli, one of the world’s foremost experts on bat viruses and director of the WIV Research Center for Emerging Infectious Diseases, claims that the WIV had no knowledge of the outbreak until 7:00 PM local time on December 30, when the Wuhan CDCP sent patient samples to the WIV for testing.⁸³³ It strains credulity that a virologist in the Netherlands was informed, presumably by Chinese sources, about the outbreak by the first week of December, but the state-run WIV, located in the epicenter of the outbreak, knew nothing about it until December 30, which happens to be the first day that the authorities acknowledged the outbreak, albeit in a confidential memo to hospital managers.

DECEMBER 2019: WUHAN BATMAN GETS A DOCUMENTARY

On December 10, the state-run media outlet China Science Communication released a seven-minute documentary⁸³⁴ showing researchers from the Wuhan CDCP, led by Tian Junhua, collecting samples of viruses from horseshoe and pipistrelle bats in caves across Hubei Province.⁸³⁵ Tian said he had collected more than 300 bat virus samples over the last decade from Hubei. The documentary also boasted that Chinese researchers had identified nearly 2,000 viruses over the past 12 years, while the world as a whole had only identified 2,284 viruses in the 200 years prior to that.⁸³⁶

Richard Ebright, a microbiologist and biosafety expert at Rutgers University, noted the video was evidence that Wuhan CDCP lab staff had “unsafe operational practices (bare skin on faces, bare skin on wrists, no goggles, no face shields).”⁸³⁷ Tian has admitted in the past to being involved in breaches of biosafety with bats. Tian told a local news outlet in 2017 that he had bad blood splatter on his skin multiple times, and once had to quarantine after getting splashed with bat urine. In the documentary, Tian is featured noting, “It is while discovering new viruses that we are most at risk of infection,” though he is shown handling sample vials without wearing full protective gear.⁸³⁸

DECEMBER 2019: WIV FILES PATENT TO CORRECT PROBLEM WITH DIFFERENTIAL AIR PRESSURE

On December 11, six researchers from the WIV and the Suzhou Institute of Biomedical Engineering Technology, a sister organization in the CAS, jointly filed a patent application for an “integrated system for use in biological protection.”⁸³⁹ The main purpose of this new integrated system was to “detect the pressure in the air channel in real time through a differential pressure transmitter, which feeds the detected signal to the control module,...[which] then sends an instruction to the solenoid valve, which closes the air channel so that the pressure in the air channel can be monitored in real time and avoid dangers caused by the abnormal failure of the air channel.”⁸⁴⁰ Biocontainment laboratories require negative airflow conditions to maintain safe operations.⁸⁴¹

In the section of the patent discussing the background of this technology, its authors identified biosafety vulnerabilities that their patent sought to address, particularly those pertaining to filters:

At present, the joints of general high-efficiency filters are mainly based on chuck joints. If they are to be used in biological protection equipment, it is necessary to add multiple connecting pipes to fix them, especially for stability during [air] conveyance. Multi-segmented connections mean [potential] dangers at multiple segments. At the same time, multi-stage detection is required, and a stable and high-efficiency filtration device in the form of a module is urgently needed.... In addition, when an accident occurs during [air] conveyance, there is no effective monitoring device to assess whether the equipment is operating normally or not.⁸⁴²

The patent is significant for the purposes of this study because it showed that efforts were underway at the WIV in 2019 to better understand and remedy potential sources of airborne hazards in laboratories, such as a viral pathogen. Readers will recall that in September, just four days after the WIV took its database of pathogens and their genomic sequences offline, the WIV issued a notice on the official procurement website for the PRC central government seeking contractors to bid for a major renovation of the WIV’s central air conditioning system at the newly constructed Zhengdian Park campus.⁸⁴³ On December 3, the WIV issued another procurement notice for air incineration devices and

testing services.⁸⁴⁴ This patent application added a third data point between September and December 2019 that indicates the WIV was experiencing serious problems with its air handling and ventilation systems. The outbreak of an airborne viral pneumonia is one way that such problems could have become evident to the WIV leadership.

DECEMBER 2019: WIV NEW HIRES RECEIVE **SECRETS TRAINING** AS PART OF BASIC ORIENTATION

On December 11, the WIV held a training class for a group of 20 new hires, including full-time researchers and post-doctoral researchers. The deputy director of the office responsible for protecting state secrets at the WIV explained the basic requirements to the new entrants and further “linked them to recent cases of state secrets violations.”⁸⁴⁵ The reader will recall that all WIV researchers were required to undergo state secrets training on May 10,⁸⁴⁶ and the importance of maintaining secrecy also featured as a key subject of the basic training for the new class of graduate students at the WIV on September 3.⁸⁴⁷ Collectively, these three reports show that all of the existing researchers and graduate students, a new class of graduate students in the fall, and a cohort of new hires in December were required to receive state secrets training, which betrays the breadth of the work at the WIV that the party-state considers to be sensitive and confidential and underscores the state-run nature of the WIV.

DECEMBER 2019: U.S. EPIDEMIOLOGIST INFORMED OF **“NEW OUTBREAK”**

On December 15, Ian Lipkin, an epidemiologist at Columbia University, heard from Chinese colleagues about a “new outbreak” in Wuhan, according to Lipkin’s firsthand account to film director Spike Lee in an August 2021 documentary titled “NYC Epicenters: 9/11 to 2021 1/2.”⁸⁴⁸ To be clear, Lipkin claimed he was informed 16 days before PRC authorities made their limited disclosure of an outbreak of “pneumonia of unknown cause” to the Chinese public, and 15 days before Shi Zhengli claims that she first became aware of the outbreak. Lipkin has worked with Chinese counterparts for nearly 20 years and has been recognized by the PRC authorities for his work on SARS.⁸⁴⁹ Lipkin said he was informed by a Chinese colleague based at a university in Guangzhou over 600 miles from Wuhan.⁸⁵⁰ Lipkin’s account shows that knowledge of the outbreak was, at a minimum, spreading among scientists and public health officials much earlier than they informed the public.

DECEMBER 2019: CAS AND PLA SCIENTISTS REFERENCE "HOLES" IN BIOSAFETY MONITORING SYSTEM

On December 20, Wang Xiaoli of the CAS Pasteur Institute in Shanghai and Zhou Dongsheng of the PLA AMMS jointly published an article on biosecurity and biosafety in the Study Times, the official newspaper of the Central Party School of the CCP Central Committee.⁸⁵¹ Readers will recall that Wang was one of two CAS scientists who published a piece in the Study Times in August, just four months prior, which warned of the possibility of viral pathogens leaking from a laboratory accident. Wang's December piece with Zhou continued to build on the theme of regulatory laxity leading to leaks: "The scope of the impact of sudden biological incidents has already expanded from the health of the populace to impact state security and strategic interests. Traditional biosecurity problems and non-traditional biosecurity problems are intertwined, external biosecurity threats and dangers from domestic supervision and regulatory holes exist side by side."⁸⁵²

Wang and Zhou asserted that developing countries, a category still often applied to China by PRC authorities, have particular challenges when it comes to biosecurity and biosafety: "Developing countries lack both the capabilities and a control and management system for dealing with the negative effects of biotechnology, have obvious internal threats, and at the same time, many strategic directions in biotechnology suffer from the 'stranglehold' phenomenon, and have invisible external threats."⁸⁵³ The authors stressed that "weak links" and "shortcomings" are quite prevalent in the biosafety and biosecurity prevention systems in developing countries.⁸⁵⁴ Xi Jinping would use these same terms employed by Wang and Zhou to describe the problems in developing countries – "regulatory holes," "weak links," and "shortcomings" – to describe the conditions in China that led to the outbreak of SARS-CoV-2 in remarks that he delivered less than two months later in February 2020.

DECEMBER 2019: MEDICAL STAFF QUARANTINED, AUTHORITIES DENY TRANSMISSION

As early as December 25, medical personnel in two hospitals in Wuhan were placed in quarantine due to suspicion that they had contracted viral pneumonia, according to an anonymous frontline doctor in Wuhan who spoke to a Chinese newspaper in late January.⁸⁵⁵ On December 30, a doctor at the Hubei Provincial Xinhua Hospital reported symptoms, which were later confirmed to have been caused by the novel coronavirus,

the second such known case of occupational transmission at this hospital in December.⁸⁵⁶ Occupational transmission of a virus among medical personnel is a clear sign of sustained person-to-person transmission, which the Wuhan authorities explicitly denied was happening in their first public acknowledgment of the outbreak on December 31 (“Up until now, the investigation has not yet uncovered obvious transmission from person-to-person nor infections of medical personnel”).⁸⁵⁷ PRC authorities at the central and local levels continued to deny that person-to-person transmission and occupational transmission among medical personnel were occurring until January 20, 2020.

DECEMBER 2019: DOCTOR ALERTS AUTHORITIES OF VIRAL ASYMPTOMATIC TRANSMISSION

On December 26, Dr. Zhang Jixian, the director of the Respiratory and Critical Care Department of the Hubei Provincial Hospital of Integrated Chinese and Western Medicine (also known as the Hubei Provincial Xinhua Hospital), treated an elderly couple with symptoms that included fever, coughing, and tiredness, which “looked like flu or common pneumonia,” Zhang recalled.⁸⁵⁸ On December 27, when CT scan results revealed ground-glass opacities in their lungs, Zhang summoned the couple’s son who lived with them to the hospital for testing. “He had no symptoms, but I discovered ground glass opacities in the CT scan of his lungs – a manifestation of viral pneumonia,” Zhang told Changjiang Daily.⁸⁵⁹

In addition, Zhang treated another patient on December 27 with coughing and fever, and ground glass opacities in lung CT scan. Blood tests for the first family of three and this additional patient all indicated they were suffering from a viral infection, and a series of influenza-related tests all came back negative.⁸⁶⁰ As soon as she reviewed the results on December 27, Zhang reported these findings to the Jiangnan District CDCP, and they dispatched someone to the hospital.⁸⁶¹ Another three patients presenting the same clinical conditions appeared at Zhang’s hospital on December 28-29, prompting the hospital management to call a meeting of specialists to discuss the situation on the afternoon of December 29.⁸⁶²

From this case, we can conclude that no later than December 27, district level authorities in Wuhan possessed convincing clinical evidence provided by a veteran respiratory specialist indicating that 1) the pneumonia outbreak was viral and not caused by influenza, 2) person-to-person transmission had occurred in a family cluster, and 3) a

person could be infected with the virus, manifesting unambiguous lung abnormalities, without presenting overt symptoms of illness, or before developing such symptoms, a fact which clearly raises the possibility of asymptomatic and/or pre-symptomatic transmission. In its first public admission of the outbreak on December 31, PRC authorities would falsely claim that the cause of the outbreak was unknown, and deny that any evidence of person-to-person transmission existed, much less asymptomatic transmission. PRC authorities would withhold these critical facts from the public for weeks after they knew them, and once admissions were made, the authorities continued to mislead the public by downplaying the severity of the situation.

DECEMBER 2019: VIRUS GENOME SEQUENCED BY DECEMBER 26, WITHHELD FOR WEEKS

Doctors from at least eight hospitals in Wuhan sent patient samples to multiple Chinese genomics companies, including the industry-leading Beijing Genomics Institute (BGI), for sequencing in December until the authorities stepped in to stop them. The results unanimously confirmed the pneumonia outbreak was caused by a SARS-like coronavirus.⁸⁶³ On the morning of December 26, Vision Medicals, a genomics company in Guangdong province, working on behalf of the Central Hospital of Wuhan, determined that a sample taken from a patient in Wuhan had tested positive for a SARS-like novel coronavirus. By noon, an “emergency meeting” was called at the company, which continued working through the day to sequence the genome and sketch a phylogenetic tree of the virus.⁸⁶⁴ By December 27, Vision Medicals had sequenced almost all of the genome of SARS-CoV-2, and shared its findings with hospital officials by phone as well as with the state-run Chinese Academy of Medical Science.⁸⁶⁵ PRC authorities, by contrast, did not admit to the world that the outbreak was caused by a novel coronavirus until 14 days later on January 9, 2020.⁸⁶⁶

The sample sequenced by Vision Medicals was taken from a 65-year-old deliveryman who worked at the Huanan Seafood Market and was admitted to the Central Hospital of Wuhan on December 18 with pneumonia. On December 24, doctors took fluid samples from his lungs and sent them to Vision Medicals for testing. In a departure from usual procedure, the company did not send back the results, but rather called the hospital on December 27 to inform them that it was a new coronavirus.⁸⁶⁷ Vision Medicals executives visited Wuhan shortly after that phone call to discuss their findings with local hospital officials and the Wuhan CDCP. “There was an intensive and confidential

investigation under way, and officials from the hospital and CDC had acknowledged many similar patients," according to Caixin.⁸⁶⁸

Using a sample sent to BGI by a hospital in Wuhan on December 26, BGI had fully sequenced the genome by December 29, making it the first known entity to do so.⁸⁶⁹ BGI sequenced at least three samples of SARS-CoV-2 drawn from different patients and reported its findings to the Wuhan Municipal Health Commission.⁸⁷⁰ PRC authorities waited for 15 days to release the sequence to the WHO, and when they finally shared it on January 12, 2020,⁸⁷¹ the move was taken in response to scientist Zhang Yongzhen having first deposited the genome on GENBNK on January 11, acting in defiance of Beijing's ban on unauthorized disclosure of information related to the virus.⁸⁷²

DECEMBER 2019: WHISTLEBLOWERS LEAK CONFIDENTIAL NOTICES TO THE WUHAN HOSPITALS

Thanks to whistleblowers in the medical community, knowledge of an outbreak of "pneumonia of unknown cause" in Wuhan first entered the public consciousness in China on December 30. On that date, the Wuhan Municipal Health Commission circulated two confidential "urgent notices" to the city's medical institutions. The first was sent at 3:10 PM local time, and stated "there has been a continuous occurrence of pneumonia cases of unknown cause at the Huanan Seafood Market in our city."⁸⁷³ It ordered hospitals to compile statistics on all such cases admitted in the previous week and report them to the commission by email before 4:00 PM⁸⁷⁴ – less than an hour after the notice was sent, indicating the urgency. The second urgent notice to the city's medical institutions went out at 6:50 PM on the same date. It stated: "Some medical institutions in our city have had a continuous occurrence of patients with pneumonia of unknown cause."⁸⁷⁵

It is worth highlighting that these two documents produced by the same office inside the same government body – the Wuhan Municipal Health Commission – described the basic facts somewhat differently over the course of only a few hours. The first notice said the continuous occurrence of pneumonia cases was "at the Huanan Seafood Market." The second notice placed it at "some medical institutions," and dropped the reference to the market altogether. That discrepancy may reflect competing internal assessments of whether the outbreak was linked to the market.

The notice prohibited its recipients from sharing information with anyone without state authorization: “[A]ll work units and individuals who have not received authorization must not arbitrarily release critical care information to the outside world.”⁸⁷⁶ A later investigation by the National State Supervisory Commission reported that the notice was leaked online within 12 minutes of its release to hospitals.⁸⁷⁷ Dr. George Fu Gao, the director of the CCDCP, reportedly first learned of the outbreak through the leaked notice, when he then called the head of the Wuhan CDCP and was told that the outbreak had been underway since the beginning of December.⁸⁷⁸

One of the whistleblowers who leaked the second confidential notice online was an ophthalmologist at Wuhan Central Hospital named Dr. Li Wenliang.⁸⁷⁹ Earlier in the day, Li had posted lab results from a patient that tested positive for “SARS coronavirus” in a social media group of former medical school classmates, noted that seven patients in a nearby hospital were quarantined in urgent care, and urged his classmates and their loved ones to take precautions.⁸⁸⁰ The lab results that Li shared were provided to him and several other doctors by Dr. Ai Fen, director of the emergency room at Wuhan Central Hospital, who also was reprimanded by the authorities for warning her fellow doctors of the coronavirus diagnosis.⁸⁸¹

DECEMBER 2019: NHC **DISPATCHES TEAM** TO WUHAN TO DIRECT EPIDEMIC RESPONSE

In the “wee hours” of December 31, the NHC dispatched a working group of experts from Beijing to Wuhan to “guide the epidemic response” in Wuhan.⁸⁸² The decision to send Beijing-based officials to Wuhan shows that local authorities were coordinating closely with the central authorities at that time. Their arrival in the early morning hours suggests that the NHC officials from Beijing met with local officials in Wuhan and provided guidance on the content of the public announcement in advance of its release by the Wuhan Municipal Health Commission at 1:38 PM local time on December 31.⁸⁸³ That announcement, the PRC’s first public acknowledgement of the outbreak, asserted that “at the present time, inquiries have found no obvious signs of human-to-human transmission and have not found infections among medical personnel.”⁸⁸⁴

These two claims, which were repeated by PRC officials at all levels more or less verbatim until January 20, almost certainly had their origin in political considerations about “stability maintenance.” The structural dynamics of the PRC government dictate that

decisions about when and what to disclose, and what to withhold, would have been made, at a minimum, in consultation with the central authorities in Beijing, and most likely, directly decided by them.⁸⁸⁵ There was no paucity of evidence on December 31. To the contrary, local authorities possessed clinical diagnosis of patient clusters, a full sequence of the genome of SARS-CoV-2, and knowledge of medical personnel being quarantined with the related illness.⁸⁸⁶

DECEMBER 2019: AUTHORITIES ACKNOWLEDGE OUTBREAK, DENY SPREAD BETWEEN PEOPLE

On December 31 at 1:38 PM local time, the Wuhan Municipal Health Commission issued a public notice (“situational report”) of the outbreak,⁸⁸⁷ in apparent reaction to the leaking of the confidential notices to hospitals online the day before. This notice was the first disclosure of the outbreak made by PRC authorities that was intended for the general public. The notice was titled “Wuhan Municipal Health Commission Situational Report on a Pneumonia Epidemic Currently in our City,” and it acknowledged a total of 27 cases of pneumonia that it explicitly linked to the Huanan Seafood Market in the first sentence of the notice.⁸⁸⁸ It claimed that only seven patients were in “serious condition,” whereas two had recovered and been released, and the remainder were in “stable condition.”⁸⁸⁹ The situational report did not indicate that a virus was the causative agent, but rather stated “at present, pathogenic detection and an investigation into the cause of infection are underway.”⁸⁹⁰

One of the two “urgent notices” to hospitals on December 30 and the situational report on December 31 claimed that unnamed medical institutions had linked the pneumonia cases to the Huanan Seafood Market. The situational report made this claim in its opening sentence,⁸⁹¹ and this claim would become a fixture of PRC official statements until May 2020. An epidemiological link between some cases and the market did exist, though not between the earliest cases and the market.⁸⁹² While this link was borne out by the available evidence for some cases, the inference that the outbreak began at the market was not justified because 34 percent of all patients admitted to the hospital for “pneumonia of unknown cause” before January 2 had no exposure to the market at all.⁸⁹³ By May 2020, the CCDCP would admit as much and rule out the market as the site of initial infection.⁸⁹⁴

Additional evidence quickly emerged that undermined the claim that the Huanan Seafood Market was the spillover site, such as the fact that the earliest case to be discovered outside of China, which was found in Thailand on January 8, involved a Chinese tourist who had never visited the market.⁸⁹⁵ Nevertheless, the public notice's framing of the outbreak in connection with the market proved to be durable, leading observers of all kinds, including many Chinese and international media outlets, to speculate that the market was the site of the original human infection for many months into the pandemic.⁸⁹⁶ Some international experts continue to engage in this line of inquiry,⁸⁹⁷ even after PRC CDCP experts ruled out the market as the site of the introduction of SARS-CoV-2 to humans, a position they adopted in May 2020 and have maintained to the present day.⁸⁹⁸

The public notice further claimed that "after the Municipal Health Commission received the report of the cases, it immediately [mobilized] the entire city's medical and public health system to launch a search and retrospective investigation of the cases connected to Huanan Seafood Market."⁸⁹⁹ It provided no date for when it received the initial report of pneumonia, and when those follow up actions were supposedly taken. The public notice listed the WIV among the group of public health, medical, and research institutions that had been mobilized in response to the outbreak. It is possible, perhaps likely, that the Wuhan Municipal Health Commission had been in close contact with the WIV about this matter much earlier than December 31 because as noted above, Hubei Vice Governor Xiao Juhua instructed the WIV to "proactively seek out the guidance and support of the National Health Commission...[and] closely coordinate with the provincial, municipal, and district [authorities]" during her inspection of the WIV on December 5.⁹⁰⁰

The public notice asserted: "[A]ll of the cases have been quarantined for treatment, and tracing, follow up investigation, and medical observation are underway for those who came into close contact [with the patients]. A health investigation and environmental sanitation disposal [effort] are currently underway at the Huanan Seafood Market."⁹⁰¹ A dubious statement that appeared in the next paragraph, which would be repeated like a political mantra until January 20, subtly contradicted that set of claims: "Up until now, the investigation has not yet uncovered obvious transmission from person-to-person nor infections of medical personnel."⁹⁰² The statement was factually untrue. The earliest patient acknowledged by the authorities experienced the onset of symptoms on

December 1. His wife, who had no exposure to the market, fell ill five days later.⁹⁰³ This means that no later than the second week of December, Wuhan doctors had documented clinical evidence of at least limited person-to-person transmission.

Moreover, as a medical matter, contact tracing and quarantine would be unnecessary if there were truly no reason to believe that person-to-person transmission were occurring. Another key statement also presumed transmissibility between people was occurring after just denying that it was: “The disease is preventable and controllable. For prevention, maintain air circulation indoors and avoid closed-off public spaces with poor air circulation and places where people gather. Wear a mask when leaving home.”⁹⁰⁴ This advice was based on the assumption that the pneumonia was viral and spreading through droplets and/or aerosols. It was inconsistent with the official denial of person-to-person transmission.

More importantly, medical personnel in Wuhan had reported to officials in late December that they had observed ample signs that the coronavirus could be transmitted between people, including infected patients who had never been exposed to the Huanan Seafood Market and medical workers who were falling ill after treating infected patients.⁹⁰⁵ See the section above that details four cases identified by Dr. Zhang Jixian on December 27 (“Doctor Alerts Authorities to Clear Evidence of Viral Asymptomatic Transmission”). The notice further claimed that “testing to determine the cause of the disease...and an investigation into the cause of infection are currently underway.”⁹⁰⁶

From the aforementioned investigative reporting by Caixin, we know that multiple companies, including BGI, had sequenced the genome of SARS-CoV-2 before December 31, determined that it was a novel betacoronavirus, and shared their findings with the Wuhan Municipal Health Commission. China’s experience with SARS-CoV-1 would have immediately alerted its scientists to the high likelihood that a novel coronavirus from the same sub-genre would also be highly contagious and lead to sustained transmission between people. The notice even acknowledged that a coronavirus was one of several known causes of viral pneumonia,⁹⁰⁷ but it stopped far short of a definitive statement that the outbreak was caused by a coronavirus. From December 30 to January 9, the authorities maintained a pretense of uncertainty around the nature of the causative agent, even though its genome had been sequenced multiple times by different commercial actors prior to December 30.

THE CHRONOLOGY: 2020

JANUARY 2020: AUTHORITIES SHUT DOWN AND SANITIZE MARKET LINKED TO OUTBREAK

On January 1, Hanjiang District authorities in Wuhan cleared out the vendors at the Huanan Seafood Market and informed the public that the market's operations would be suspended until further notice. Just the day before, the authorities had publicly linked the outbreak of pneumonia to the market and sent crews to begin disinfecting the grounds.⁹⁰⁸ Some contemporaneous media reports as well as a study published in June 2021 documented the sale of various live mammals, poultry, and reptiles at the Huanan Seafood Market, including some wildlife trade, but no bats or pangolins were traded there.⁹⁰⁹ Most wet markets in Wuhan reopened when the lockdown was lifted in the city on April 8, but the Huanan Seafood Market did not reopen at that time and does not appear to have reopened at the time of writing.⁹¹⁰ Some observers interpreted the shutdown and clean-up effort as attempts by officials to destroy evidence of a zoonotic spillover event at the market,⁹¹¹ particularly in light of the history of SARS-CoV-1 having been introduced into a human population through zoonosis at a market setting in southern China in 2003.

JANUARY 2020: PARTY/STATE-RUN MEDIA AND SECURITY OFFICIALS TARGET WHISTLEBLOWERS

Starting on January 1, the local authorities in Wuhan and central authorities in Beijing joined forces to retaliate against the whistleblower doctors who forced their hands on December 30, making a public example of them to deter any others from following suit. On the afternoon of January 1, the Wuhan Municipal Public Security Bureau announced on its official Weibo social media account that it had “already investigated and dealt with eight rumormongers according to the law,”⁹¹² who had “disseminated and reposted untruthful information online that caused a harmful effect on society.”⁹¹³ The People's Daily, the official mouthpiece of the CCP, published an article on the morning of January 2 further highlighting the news that the rumormongers had been punished.⁹¹⁴ Later that same day, the state broadcaster CCTV also ran the report on its nationwide evening TV news segment.⁹¹⁵

The party-state appears to have been trying to intimidate would-be whistleblowers, as they had not, in fact, punished Dr. Li Wenliang at the time that they launched the public

campaign to criticize him and the others. Public security officials summoned eight medical personnel responsible for leaking the relevant information online on January 3, including Li⁹¹⁶ – the day after they were lambasted by state and party media. Security officials questioned these whistleblowers at length and forced them to sign a self-confession for “spreading rumors” about the pneumonia outbreak,⁹¹⁷ which they had accurately described as similar to SARS. The document that security officials compelled Li and others to sign read in part: “We solemnly warn you: If you keep being stubborn, with such impertinence, and continue this illegal activity, you will be brought to justice – is that understood?”⁹¹⁸ The mistreatment of Li and other whistleblowers was an example of the CCP using humiliation as a tactic to force elites to conform to its political edicts, even when such conformity violates their professional ethics and judgement.⁹¹⁹

We can confidently conclude that the central authorities were aware of the punishment of Li Wenliang and the other whistleblowers because the matter was covered prominently by media outlets that are directly controlled by the CCP Central Propaganda Department based in Beijing, not in Wuhan. Moreover, this was the first, but not the last, known incident of punitive measures being taken against whistleblowers in Wuhan during the pandemic. At least 254 people would be punished within a week for “spreading rumors.”⁹²⁰ Journalists, lawyers, and other concerned Chinese citizens who subsequently tried to document what was happening in Wuhan for the general public and posterity, such as Li Zehua,⁹²¹ Chen Qiushi,⁹²² Fang Bin,⁹²³ and Zhang Zhan,⁹²⁴ were all detained, disappeared, and/or sentenced to prison.

JANUARY 2020: BEIJING IMPOSES **GAG ORDER**, MANDATES DESTRUCTION OF VIRUS SAMPLES

Beginning on the first day of 2020, PRC authorities implemented a gag order against medical professionals, academic researchers, and commercial biotechnology firms sharing any information related to the outbreak of SARS-CoV-2, the nature of the virus, and key pieces of data, such as samples of the virus. Commercial genomic sequencing companies were targeted first because they had already processed sequencing results for hospitals in Wuhan in December.

On January 1, after several batches of genomic sequencing results had been returned to hospitals and submitted to the health authorities, an employee of one genomics company received a phone call from an official at the Hubei Provincial Health Commission

ordering the company to stop testing samples from Wuhan related to the new coronavirus, and to destroy all existing samples, according to Chinese investigative journalists.⁹²⁵ On January 2, Wang Yanyi, the director of the WIV, citing an order from the NHC, reportedly circulated a notice within the WIV that strictly prohibited the disclosure of any information related to the virus or the outbreak. It specified that nothing could be shared with the media, even state-run official media, or with “partner organization (including technical services companies).”⁹²⁶

On January 3, the gag order was applied nationally when the General Office of the NHC issued a classified, red-letterhead directive⁹²⁷ called the “Notice on Strengthening the Management of Biological Sample Resources and Related Scientific Research Activities in the Prevention and Control of Major Infectious Diseases.”⁹²⁸ The directive forbid researchers, medical professionals, and others from publishing or sharing any information related to the virus without state authorization and ordered labs in possession of relevant samples to transfer them to designated institutions or destroy them.⁹²⁹ The order, which both Caixin and Senator Rubio’s staff have seen, did not specify any designated testing institutions. One virologist told Caixin that even the WIV was not authorized to do testing and was told to destroy the samples in its lab.⁹³⁰ Despite the leaking of the NHC directive in April 2020, which applied to all laboratories throughout China, Shi Zhengli denied in a July 2020 interview with Science Magazine that she was ever instructed to destroy any virus samples.⁹³¹ The directive also reportedly instructed hospitals to not enter data from coronavirus patients into the surveillance system set up by the CCDCP to track outbreaks.⁹³²

At the time of printing of this report, PRC authorities had still not allowed Chinese researchers to engage in the exchange of clinical samples or isolates of SARS-CoV-2 with international counterparts, and the prohibition appears to extend to related coronaviruses, such as RaTG13. Senator Rubio’s staff spoke with American experts with a history of collaborative research with the WIV who confirmed that the exchange of samples ceased entirely after the outbreak. WIV coronavirus expert Shi Zhengli reportedly planned to share a sample with an American research partner at the Galveston National Laboratory, but officials in Beijing blocked her from doing so.⁹³³ Another U.S. coronavirus expert who pioneered the “no-see-um” method of viral genome manipulation,⁹³⁴ and collaborated with Shi on studies that involved bioengineering chimeric viruses,⁹³⁵ referred at the time to the PRC authorities’ prohibition on the

sharing of clinical samples euphemistically as “bureaucratic hurdles.”⁹³⁶ The NHC obviously knew exactly what it was dealing with – a novel coronavirus – when it composed and disseminated this confidential directive, which further demonstrates that the decision to not acknowledge the causative agent until January 9 was a political one.

January 2020: Beijing Communicates with WHO Only After WHO Requests Information

The China Country Office of the WHO first became aware that cases of pneumonia of unknown etiology had been detected in Wuhan on December 31, the same day that the public notice was released by the Wuhan Municipal Health Commission.⁹³⁷ PRC authorities did not, however, notify the WHO or bring its attention to the public notice. The WHO learned of the situation because of an open-source platform that scouts for intelligence on outbreaks. The WHO then requested information from Beijing.

Under international law, national governments are required to respond to such requests from the WHO within 24-48 hours of receiving them. Beijing waited the full 48 hours – until January 3 – before telling the WHO that there had been 44 cases and no deaths.⁹³⁸ WHO public reporting on the matter was vague, opting for the passive voice (“was informed of cases of pneumonia” without saying informed by whom, or the medium by which they were informed).⁹³⁹ In a report dated January 5, the WHO repeated the dubious claims of the December 31 Wuhan Municipal Health Commission’s public notice that “the causal agent has not yet been identified or confirmed,” and that “no evidence of significant human-to-human transmission and no health care worker infections have been reported.”⁹⁴⁰

JANUARY 2020: WIV HOLDS MEETING ON SAFETY, SECURITY, AND RECORD KEEPING

On January 3, the WIV held a work meeting on safety, security, and record-keeping that was attended by over 60 leaders of the WIV, including department heads, research team leads, and safety personnel.⁹⁴¹ One WIV official opened the meeting by “analyzing the existing difficulties and problems that the institute has had with safety and records management processes, putting forth measures to solve them, and outlining the deployment arrangements for related work in 2020.”⁹⁴² He Changcai, the deputy secretary-general of the WIV CCP committee, urged those present to “ensure safety without accidents” in 2020, noting that it was “vitally important to do a good job with safety and record-keeping work throughout the entire year.”⁹⁴³

The summary of He's comments are worth quoting at length:

You must fully comprehend the arduous, complicated, sudden, and long-lasting nature of safety work, go a step further to strengthen safety awareness, your sense of responsibility and [your] sense of crisis, [and] at no time whatsoever can you treat safety work lightly. You must go a step further to strengthen the implementation of responsibilities, strengthen the rectification of hidden safety dangers, strengthen the management of the use of hazardous chemicals, being cautious and conscientious, fulfilling one's duties and responsibilities to do a good job with safety for each work project.⁹⁴⁴

He concluded by emphasizing the importance of record-keeping: "Strictly carry out the related rules of the state, the CAS, and the institute, and as you complete the work of collection, collation, and transfer of department records, guaranteeing both the quality and quantity [of reports] and doing so on time."⁹⁴⁵

JANUARY 2020: WUHAN AUTHORITIES AGAIN DENY TRANSMISSIBILITY OF PNEUMONIA

On January 3, the Wuhan Municipal Health Commission released a statement reiterating its claim of December 31 that it had no evidence that showed the pneumonia outbreak was transmissible between people: "As of now, preliminary investigations have shown no clear evidence of human-to-human transmission and no medical staff infections."⁹⁴⁶

On January 5, the Wuhan Municipal Health Commission released another update in which it stated that "preliminary investigations have shown no clear evidence of human-to-human transmission and no medical staff infections."⁹⁴⁷ As discussed above, multiple cases of transmission between family members, including individuals who were never exposed to the market, had been documented by no later than December 10, and Dr. Zhang Jixian had even documented asymptomatic transmission in a family cluster by December 27. These findings had been reported to the Wuhan Municipal Health Commission well in advance of its misleading public statements.

JANUARY 2020: TEARFUL PHONE CALL BETRAYS TRUE SEVERITY OF SITUATION

In early January, George Fu Gao, an epidemiologist and the director-general of the CCDCP, had a series of phone calls with his American counterpart, Dr. Robert Redfield, a virologist and the director of the U.S. Centers for Disease Control and Prevention.

During a conversation on January 4, Gao, a sober man not known for emotional outbursts, “became distraught and started crying after finding ‘a lot of cases’ among individuals who had not been to the wet market,” according to Redfield’s account of the conversation to CNN.⁹⁴⁸

Redfield also implied that leaders inside the CCP and PRC government had not given Gao, their foremost expert of infectious disease, access to the information that would have allowed him to understand the magnitude and severity of the outbreak until those early days of January.⁹⁴⁹ Despite expressing the feeling of being overwhelmed by the situation, Gao rebuffed Redfield’s offers to dispatch U.S. experts to provide technical assistance to combat the outbreak. Gao said he did not have the authority to accept Redfield’s offer, and the CCP leaders who could accept it were unwilling to do so.⁹⁵⁰ That Gao acknowledged many cases with no tie to the Huanan Seafood Market on January 4 further shows that central government officials were aware of person-to-person transmission long before they warned the public of the risks.

JANUARY 2020: WUHAN HOLDS ANNUAL POLITICAL MEETINGS, REPORTS NO NEW CASES

The Wuhan Municipal People’s Government went forward with the two annual meetings of the local legislature and its political advisory body that began on January 6 and concluded on January 10. During this four-day period, the Wuhan Municipal Health Commission issued no updates at all on the outbreak of “pneumonia of unknown cause,” which it had first acknowledged on December 31.⁹⁵¹

JANUARY 2020: XI CHAIRS FIRST POLITBURO STANDING COMMITTEE MEETING ON THE OUTBREAK

Xi Jinping claimed that he chaired a meeting of the Politburo Standing Committee, the CCP’s highest level decision-making body, on January 7, where he “put forth requirements regarding prevention and control work for the novel coronavirus pneumonia epidemic.”⁹⁵² Xi did not make this claim, however, until mid-February after a period of extended absence from the public and coming under criticism for his response to the outbreak. Xi revealed no other details of what transpired or was said at this meeting. January 7 was two days before the authorities indirectly admitted to the public for the first time that the causative agent of the outbreak was a novel coronavirus. This meeting was not reported by state media at the time, and Xi did not refer to the meeting

until a speech on February 3, which itself was not reported to the public until February 15.

JANUARY 2020: XI TELLS THE PARTY TO GUARD AGAINST UNSPECIFIED DANGERS WITHIN THE PARTY

On January 8, the CCP held a national level meeting in Beijing on the theme of “Never Forget Our Original Aspiration and Remember Our Founding Mission.” It was chaired by Politburo Standing Committee Member and Ideology Czar Wang Huning.⁹⁵³ In his remarks to the meeting, delivered just one day after he convened the party’s top seven leaders to discuss the novel coronavirus outbreak, Xi Jinping alluded to serious problems within the CCP that threatened its ability to retain power: “We must resolutely remove whatever factors weaken the Party’s advanced nature and undermine the Party’s purity, and excise all malignant tumors multiplying on the body of the Party.”⁹⁵⁴ Xi added that the CCP should “resolutely guard against all dangers that run counter to our original aspiration and mission [of the Party] and shake its foundation.”⁹⁵⁵

JANUARY 2020: WSJ STORY FORCES ADMISSION OF CAUSATIVE AGENT AFTER WEEKS-LONG DELAY

On January 9 at 9:45 AM local time, the PRC state-run media first reported to the public that a “preliminary assessment” had indicated that the outbreak of pneumonia in Wuhan was caused by a novel coronavirus.⁹⁵⁶ As indicated by the use of a qualifier like “preliminary assessment,” the authorities had not yet allowed for a full and complete admission of the seriousness of the situation at hand, and this partial admission did not amount to a clear and unambiguous official statement that a pathogen of pandemic potential was spreading throughout China. The statement did not come directly from the CCDCP,⁹⁵⁷ the NHC, or the State Council. Rather it came during a Xinhua interview with Xu Jianguo, a clinical microbiologist who was leading an assessment team advising the central government.⁹⁵⁸

In what may have been an attempt to conceal the delay in disclosing the causative agent, Xu claimed that the full genome of the novel coronavirus was not sequenced until 9:00 PM on January 7.⁹⁵⁹ A subsequent investigative report, however, found that Wuhan authorities had laboratory confirmation of a novel coronavirus no later than December 27.⁹⁶⁰ That amounts to at least a two-week delay in public disclosure of critically important information. For further corroboration, we note that the Wuhan Municipal

CDCP had already determined the outbreak was caused by a novel coronavirus when it first contacted the WIV on December 30, according to Shi Zhengli,⁹⁶¹ and the WIV had “confirmed the full sequence of the genome of the novel coronavirus” by January 2 and isolated it by January 5, according to a WIV report.⁹⁶² The head of the Jinyintan Hospital in Wuhan reportedly indicated that the authorities had shared the genomic sequence with the WIV even earlier on December 27.⁹⁶³ The CCDCP had also sequenced the genome and established the existence of three distinct strains of the virus by January 3.⁹⁶⁴ By January 5, a team in Shanghai led by Zhang Yongzhen had also isolated the virus and fully sequenced its genome, as had the state-run Chinese Academy of Medical Sciences.⁹⁶⁵

Official knowledge that a novel coronavirus was the causative agent of the outbreak predated public disclosure of that information by several days (according to official sources), at least two weeks (based on two investigative reports), and potentially even months (based on information uncovered by this study). The authorities were unquestionably in possession of the genomic sequence before the night of January 7. We suspect that Xu claimed that the genome had not been sequenced until January 7 because that was the date that Xi Jinping chaired a meeting (see above) to decide whether further information would be disclosed. Moreover, on January 8, the WSJ became the first outlet in the world to break the story that Chinese scientists had identified a novel coronavirus,⁹⁶⁶ a development which seems to have forced the PRC authorities to belatedly admit to the causative agent on January 9 (while continuing to discount its pathogenicity and transmissibility).⁹⁶⁷

In the January 9 interview, Xu Jianguo minimized the connection between the novel coronavirus and SARS-CoV-1 that affected China in 2003: “The novel coronavirus that gave rise to this outbreak is different than other known human coronaviruses.”⁹⁶⁸ Xu’s effort to downplay its severity continued in an interview with Science Magazine the next day: “No new patients have appeared, as far as I understand. It’s good news. People fear something like SARS in 2003, but this is a different case. The outbreak is limited, but we should test patients one by one [to identify] pneumonia caused by other pathogens.”⁹⁶⁹ In reality, there is nearly 80 percent similarity at the complete genome level between SARS-CoV-1 and the novel coronavirus from Wuhan,⁹⁷⁰ which one Chinese scientist recognized immediately upon sequencing it on January 5.⁹⁷¹

Even after the admission of the causative agent, PRC authorities continued to deny evidence of human-to-human transmission, including infections among healthcare workers, for nearly another two weeks before finally acknowledging “limited” spread between people on January 20. Beijing also did not share the genomic sequence with the world until January 12, a day after a scientist in Shanghai broke ranks and released the sequence through a colleague in Australia.

JANUARY 2020: AUTHORITIES **CLOSE LAB** THAT RELEASED THE GENOMIC SEQUENCE TO THE WORLD

Much as the PRC authorities did not admit to the public that an outbreak was underway until whistleblower doctors leaked a notice online, the first genomic sequence of SARS-CoV-2 was likewise released to the world by a scientist acting in defiance of the party-state, not by the authorities themselves. On January 3, the same day the NHC gag order came down from Beijing, Professor Zhang Yongzhen of Fudan University received biological samples packed in dry ice in metal boxes and shipped by rail from Wuhan Central Hospital. Professor Zhang's team at the Shanghai Public Health Clinical Center worked around the clock, and by 2:00 AM on the morning of January 5, they had isolated SARS-CoV-2 and sequenced its full genome.⁹⁷²

Zhang's team immediately shared the sequence with the Shanghai Municipal Health Commission and the NHC and sought permission to release it.⁹⁷³ They further warned that the genome indicated it was a contagious respiratory-borne virus and urged preventive measures be taken in public areas.⁹⁷⁴ Zhang reportedly uploaded the sequence to GenBank shortly thereafter, but initially requested that the data remain confidential until July 12.⁹⁷⁵ Zhang had dinner with top public health officials in Wuhan on January 8 to discuss his findings.⁹⁷⁶ On January 11, six days after Zhang shared his findings with the authorities, Zhang's research partner in Australia, Edward Holmes, called Zhang and urged him to publish the sequence.⁹⁷⁷ Zhang thought it over for a few minutes and called Holmes back to tell him to release the genomic sequence on the open platform Virological.org. Zhang then contacted GenBank to lift the embargo on January 12.⁹⁷⁸ Zhang was en route to Beijing at the time.⁹⁷⁹ One day later, the authorities closed Zhang's lab for “rectification,”⁹⁸⁰ and it remained closed at the end of February,⁹⁸¹ but it was eventually allowed to reopen.

JANUARY 2020: NHC CONTINUES TO DENY PERSON-TO-PERSON TRANSMISSION

On January 11, the same day that Zhang Yongzhen released the genomic sequence of SARS-CoV-2 to the world, the NHC released a report titled “Notification of Wuhan Municipal Health Commission on Unexplained Viral Pneumonia.”⁹⁸² Not only was it incorrect to characterize the viral pneumonia as “unexplained” after Zhang had shared the genomic sequence for SARS-CoV-2 with the NHC on January 5, and the NHC’s own sub-agency the CCDCP had sequenced it in full on January 3, the NHC report continued to deny the occurrence of human-to-human transmission: “All 739 close contacts, including 419 medical staff, have been under medical observation and no relevant cases have been found.... [N]o clear evidence of human to human transmission has been found.”⁹⁸³ On the same day, the Wuhan Municipal Health Commission issued a Q&A factsheet claiming that “most of the unexplained viral pneumonia cases in Wuhan this time have a history of exposure to the South China seafood market. No clear evidence of human-to-human transmission has been found.”⁹⁸⁴

JANUARY 2020: BEIJING SHARES GENOMIC SEQUENCE WITH WHO AFTER SCIENTIST PUBLISHES IT

On January 12, the NHC belatedly shared the genomic sequence with the WHO – one day after Zhang Yongzhen’s team at Fudan University published the sequence without authorization through a research partner in Australia. Even under these circumstances, Beijing stalled for at least two more weeks before providing the WHO with detailed data on patients and cases.⁹⁸⁵ Beijing’s delay in sharing the genomic sequence with the WHO stymied recognition of the rapid spread of the coronavirus to other countries, along with the development of tests, drugs, and vaccines. By one estimate, the outbreak spread by a factor of 100-200 times as a result of this delay.⁹⁸⁶

JANUARY 2020: HUBEI HOLDS ANNUAL POLITICAL MEETINGS, SUPPRESSES REPORTS OF NEW CASES

The Hubei Provincial People’s Government, the capital of which is the city of Wuhan, went forward with two annual meetings of the provincial legislature and its political advisory body that began on January 11 and concluded on January 17. The Wuhan Municipal Health Commission started issuing updates on the pneumonia outbreak on January 12, but between that day and January 17, the commission denied that any new cases of the novel coronavirus had been reported anywhere in the city.⁹⁸⁷ According to

an internal report written by a Chinese media outlet exclusively for the relevant central authorities, the local authorities in Wuhan, especially between January 12-17, “willfully chose not to carry out epidemiological surveys, make arrangements to confirm cases, or order any quarantine measures to address the continuously rising suspected cases of novel coronavirus patients.”⁹⁸⁸

For nearly two full weeks, as the Hubei provincial and Wuhan municipal governments held their annual meetings, Wuhan authorities reported no new infections, and officials silenced doctors who warned that cases were mounting.⁹⁸⁹ Meanwhile, one doctor described the terrible scene at his hospital in Wuhan during this time period: “The outpatient section of our hospital was overflowing with a large number of suspected cases that could not be admitted to the hospital, one patient was on his knees pleading with doctors to admit him for treatment, and some patients with serious infections didn’t even have the strength to climb on to the table to take a CT scan. They would just topple over.”⁹⁹⁰

JANUARY 2020: NEIGHBORING COUNTRIES CONFIRM CASES AS CHINA **DENIES** TRANSMISSIBILITY

On January 13, Thailand’s Ministry of Public Health reported that a 61-year-old Chinese woman arriving at the airport in Bangkok had tested positive for the novel coronavirus. She had not visited the Huanan Seafood Market in Wuhan where the authorities suggested the outbreak began, but she had visited a different market where live animals may have been on sale. Four days later, the Thai ministry announced that a 74-year-old Chinese woman had been quarantined on arrival in the country and had tested positive.⁹⁹¹ On January 15, Japan’s Ministry of Health announced that a Japanese man in his thirties who had been to Wuhan tested positive for the virus on his return to Japan.⁹⁹² Japan’s Health Ministry said the patient had not visited any markets in China, adding that “it is possible that the patient had close contact with an unknown patient with lung inflammation while in China.”⁹⁹³ On January 19, South Korea identified its first confirmed case: a 35-year-old Chinese woman who flew from Wuhan to Seoul and was isolated on entry into the country because of her symptoms, including a high fever.⁹⁹⁴

JANUARY 2020: NHC HOLDS **CONFIDENTIAL** CALL TO TELL OFFICIALS ABOUT SEVERITY OF OUTBREAK

On January 14, Ma Xiaowei, the minister in charge of the NHC, held a confidential national teleconference with officials to convey instructions on responding to the coronavirus from Xi Jinping, Premier Li Keqiang, and Vice Premier Sun Chunlan. A confidential memo on the teleconference obtained by the Associated Press included a section titled “sober understanding of the situation,” in which the government conceded that “clustered cases suggest that human-to-human transmission is possible,” an important finding that Beijing would not share with the public for another six days, and for which they had evidence as early as December 27.⁹⁹⁵

The memo singled out the case in Thailand, noting that the spread of the virus abroad had fundamentally changed the situation from Beijing’s perspective. The memo further warned: “With the coming of the Spring Festival, many people will be traveling, and the risk of transmission and spread is high. All localities must prepare for and respond to the epidemic.” Ma warned officials the novel coronavirus would present the “most severe challenge since SARS.”⁹⁹⁶ The NHC also distributed a 63-page set of instructions to provincial health officials. The instructions ordered health officials nationwide to identify suspected cases, ordered hospitals to open fever clinics, and required doctors and nurses to wear protective gear. These instructions were marked “internal,” “not to be spread on the internet,” “not to be publicly disclosed.”⁹⁹⁷

JANUARY 2020: WUHAN AUTHORITIES AGAIN **DENY PERSON-TO-PERSON** TRANSMISSIBILITY

On January 14, the same day that the NHC held a confidential meeting to discuss the “most severe challenge since SARS,” the Wuhan Municipal Health Commission released a public statement claiming: “Among the close contacts [of patients diagnosed with the novel coronavirus], no related cases were found.”⁹⁹⁸ As discussed above, multiple cases of transmission between family members, including individuals who were never exposed to the market, had been documented by no later than December 10, and Dr. Zhang Jixian had even documented asymptomatic transmission in a family cluster by December 27. These findings had been reported to the Wuhan Municipal Health Commission well in advance of this misleading public statement.

By January 12, Beijing, Shanghai, and Shenzhen municipalities, which span from northern China to eastern China to southern China, had all reported to the NHC confirmed cases of patients who had no history of exposure to the Hainan Seafood